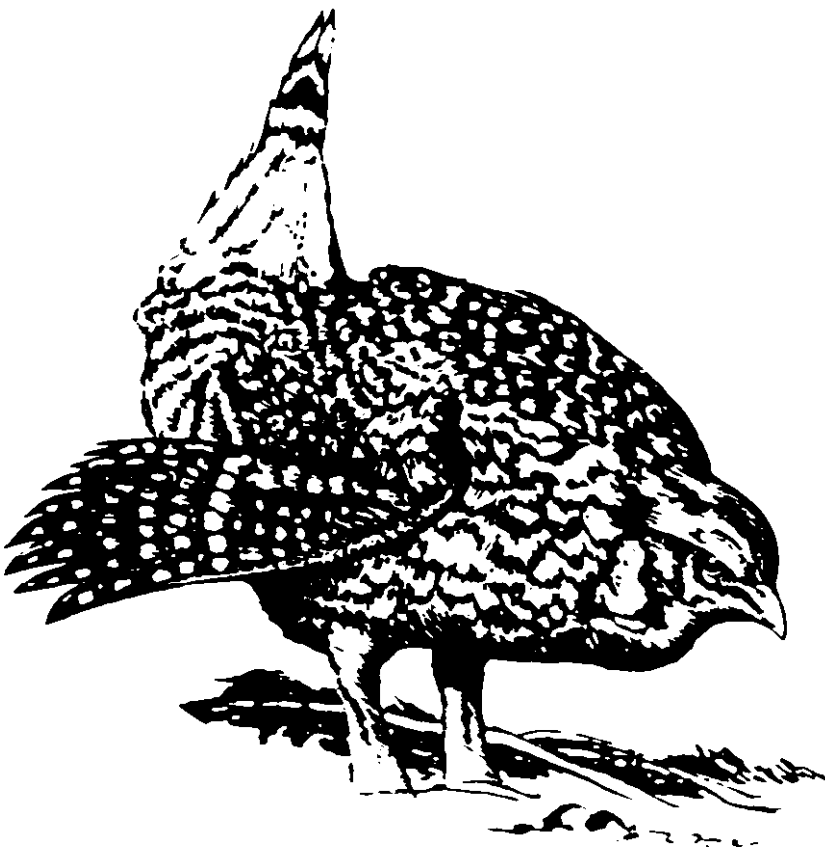


Sharp-tailed Grouse Management Plan Columbia River Wildlife Mitigation Grand Coulee Dam Project

Washington Department of Wildlife



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GRAND COULEE DAM WILDLIFE MITIGATION PROGRAM
SHARP-TAILED GROUSE PROGRAMMATIC MANAGEMENT PLAN
TRACY ROCK VICINITY
LINCOLN COUNTY, WASHINGTON

Prepared for
Bonneville Power Administration
Division of Fish and Wildlife
Under Agreement No. CE-B179-91BP18504
Phase One Project No. 91-061

By
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Washington Department of Wildlife

ABSTRACT

This programmatic management plan is designed to provide general guidance to wildlife managers/planners for the management of sharp-tailed grouse and shrub-steppe habitat within the proposed Tracy Rock wildlife mitigation area.

The plan focuses on the management of sharp-tailed grouse and shrub-steppe habitat relative to livestock grazing and methods for permanently protecting key habitats. In addition, the plan describes habitat types and wildlife species that occur on the project site, and addresses how issues such as crop depredation, predator control, taxation, noxious weeds, fire control, recreation, and access will be managed on project lands.

The sharp-tailed grouse management section includes a life history of the grouse, Washington Department of Wildlife management standards and guidelines, and generic management objectives for the species. Management objectives are identical under perpetual conservation easements or fee title land purchase protection options. Grazing regimens, whether on lands under perpetual conservation easements or purchased in fee, will be determined by the biological needs of the sharp-tailed grouse.

The range management section describes various grazing systems that could be used to manipulate habitat to accomplish wildlife management objectives. Habitat development/manipulation techniques are also outlined within the plan.

The Habitat Evaluation Procedure (HEP) was used to determine base line habitat conditions and to estimate existing Habitat Units (HUs) at the Tracy Rock site (one HU is equivalent to one acre of optimum habitat).

All technical information for this plan was provided by intra-agency technical groups, scientific literature, personal communications, and other federal and state agencies.

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INTRODUCTION

This project was proposed by the Washington Department of Wildlife (WDW) as partial mitigation for the hydropower share of wildlife habitat losses from construction and operation of Grand Coulee Dam. The project is funded by Bonneville Power Administration (BPA) and carried out in cooperation with the WDW, the Bureau of Land Management (BLM), U. S. Fish and Wildlife Service (USFWS), Grand Coulee/Chief Joseph Wildlife Mitigation Steering Committee, Columbia Basin Fish and Wildlife Authority (CBFWA), Northwest Power Planning Council (NPPC), Bureau of Reclamation (BOR), and others. The project will be consistent with Section 1003(b)(7) of the Council's Wildlife Rule, which addresses mitigation for wildlife losses due to the Federal Columbia River Power System.

The NPPC and the BPA approved the sharp-tailed grouse project as partial mitigation for impacts caused by the construction of Grand Coulee Dam. The focus of this project is the permanent protection and enhancement of shrub-steppe/sharp-tailed grouse habitat in northeastern Washington.

In conformance with the NPPC Wildlife Rule, the BPA will explore the use of perpetual conservation easements (Alternative 1) before considering the outright purchase of land (Alternative 2). Under both alternatives the biological requirements of the sharp-tailed grouse will take precedence over all other considerations including recreational opportunities and livestock grazing.

Perpetual conservation easements must achieve biological objectives in a cost-effective manner when compared with the fee title acquisition option.

Land or easements will be purchased only from willing sellers. Land condemnation will not occur for this project.

BACKGROUND

Mitigation Process Under the Northwest Power Act

Grand Coulee Dam was built on the Columbia River in the 1930s. Its reservoir, Lake Roosevelt, flooded 151 miles of river including nearly 83,000 acres of wildlife habitat. Even though Grand Coulee Dam contributed significantly to the prosperity of the region, some native wildlife populations suffered as critical habitats were flooded or converted to agricultural uses. Until recently, nothing was done to make up for, or "mitigate," wildlife losses.

In 1980, Congress passed the Pacific Northwest Electric Power Planning and Conservation Act (Northwest Power Act) requiring the region, with the BPA's support, to "protect, mitigate, and enhance" wildlife to the extent it was affected by hydroelectric development and operation. This legislation also created the NPPC.

Through the 1980s, the NPPC worked with federal and state agencies and Indian tribes to develop reservoir mitigation plans. The NPPC considered wildlife loss estimates, methods of restoration, private versus public land use, leasing versus willing seller only acquisition, impacts to local economies, the role of local government in the planning process, and other concerns.

In 1989 the NPPC amended the Columbia Basin Fish and Wildlife Program and created the current Wildlife Rule. The resultant Wildlife Rule included a series of criteria to be used to ensure that public concerns are addressed in each mitigation project proposal made by wildlife management agencies (Appendix A).

Both in 1990 and in 1991, the Washington State Legislature, together with the WDW, provided funding to develop mitigation strategies on private lands in the Lake Roosevelt area to address the needs of sharp-tailed grouse and pygmy rabbits.

In March 1990, the Grand Coulee Wildlife Mitigation Advisory Group was formed by the WDW to help advise in the mitigation process. The advisory group is comprised of about 50 individuals primarily from the counties bordering Lake Roosevelt (FDR). A six-member steering committee, representing local government, utilities, landowners, conservation groups, environmentalists, and Indian tribes, was selected by the advisory group to work closely with WDW, NPPC, and BPA officials. In 1991, additional representatives from the Cattlemen's Association, the Wheatgrowers Association, the Upper Columbia River Counties (UCRC), and a local sportsmen's organization were added, bringing the steering committee up to 13 members (Appendix B).

In 1990 WDW, in concert with the steering committee, developed several shrub-steppe wildlife mitigation project proposals to begin addressing impacts caused by Grand Coulee Dam. These proposals were approved by BPA and NPPC and determined to be consistent with the Council's Wildlife Rule.

A Pre-design Contract, between the WDW and the BPA, was implemented in May 1991. The agreement called for development of programmatic management plans for sharp-tailed grouse and pygmy rabbit, perpetual conservation easement

language terms and conditions, and a Memorandum of Agreement (MOA) between the WDW and BPA. The WDW was responsible for accomplishing the agreement objectives, while funding for the Pre-design Contract was provided by BPA.

General Project Environment

The proposed Tracy Rock project site encompasses approximately 25,000 acres in central Lincoln County. Figure 1 shows the general project area and its immediate vicinity.

The area is sparsely populated and is primarily rangeland used for livestock grazing. Some production of wheat and small grains also occurs (Figure 2).

Approximately 90 percent of the land within the project site is privately owned. The remainder is either state land managed by the WDW, Department of Natural Resources(DNR), or county property (Figure 3).

Physiography and Relief

The proposed project area is located on the Columbia Plateau. As many as 15 layers of basalt resulting from volcanic eruptions during the Miocene and Pliocene eras cover some portions of the plateau, ranging from 1,000 to 4,500 feet in thickness. This topography was modified by glaciers forming and retreating and by a series of floods caused by ice dams across the Columbia River that repeatedly forced the river from its channel across the Columbia Plateau. The floods created deep canyons, called coulees, and rocky shallower canyons, known as channeled scablands.

Most of the Tracy Rock project area is composed of channeled scablands. The channeled scablands are characterized by rough relief. They were formed when glacial meltwater scoured loess-covered basalt bedrock. The dominant features are the channels, plateaus, and buttes. Along the channels are outwash terraces, bars, loess islands, and cataracts and basins. On the plateaus the relief is broken by circular mounds of loess ("biscuits") surrounded by cobble-size fragments of basalt.

In approximately half of the scabland area, basalt is exposed at the surface. In the rest of the area, a thin layer of loess overlies the basalt or glacial outwash (Stockman, 1980).

The topography in the vicinity of the proposed site gradually increases in elevation from southwest to northeast extending from approximately 1,850 feet at Lower Twin Lake to about 2,300 feet at Tracy Rock.

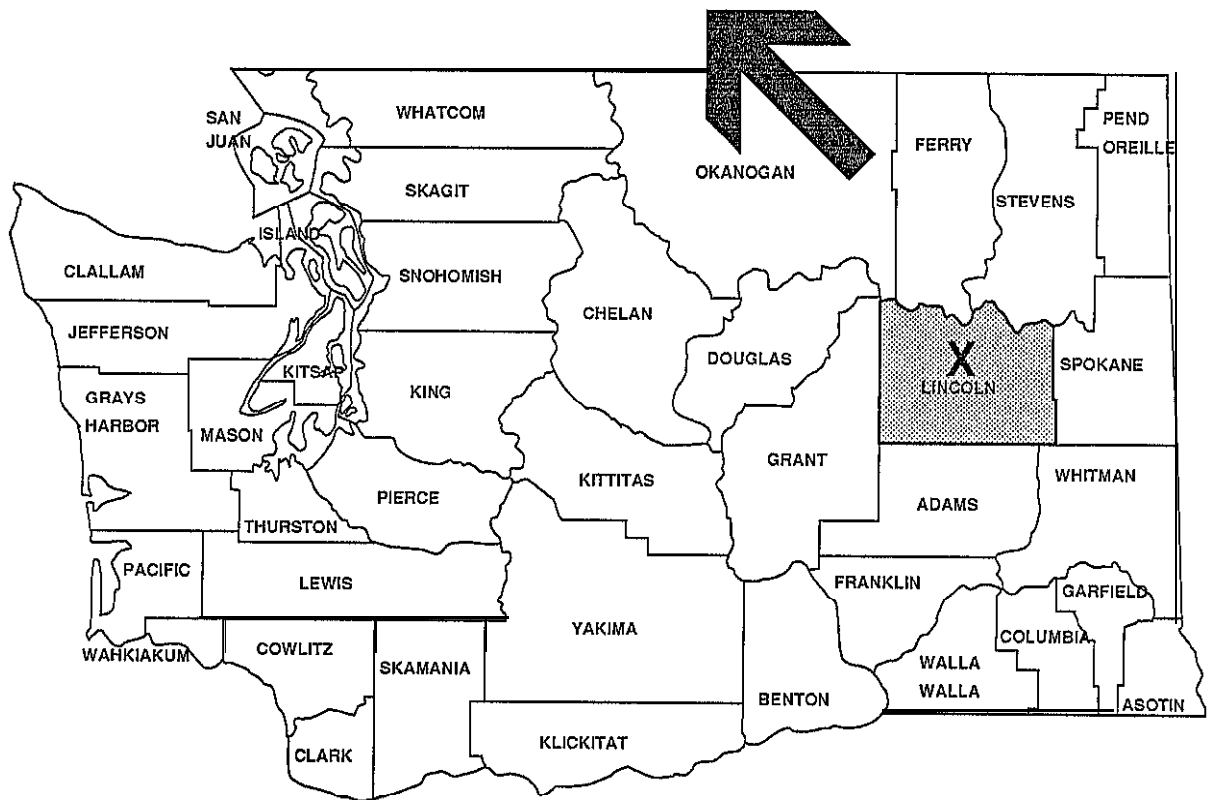
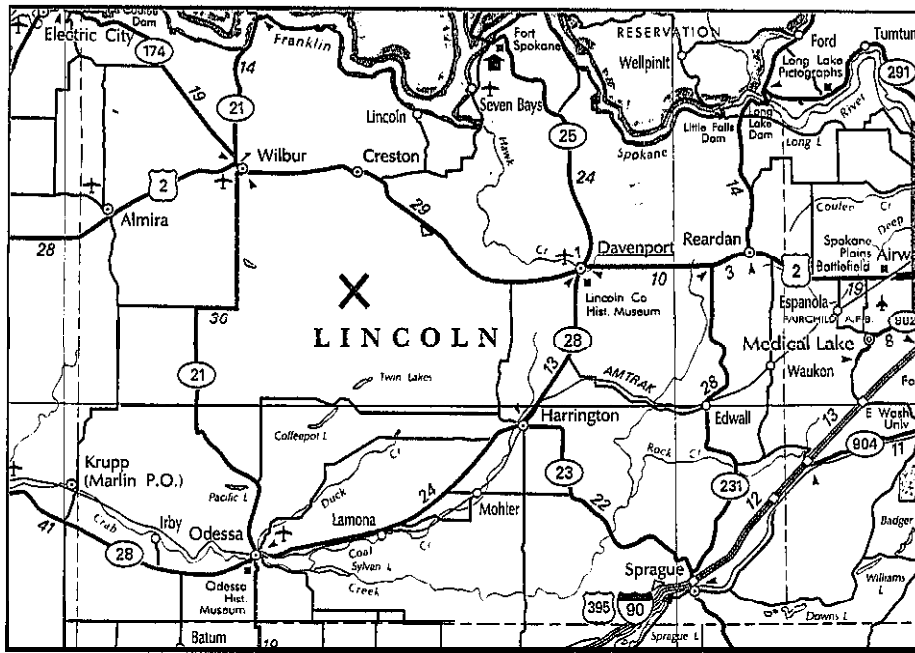


Figure 1. Proposed Tracy Rock project area and vicinity.

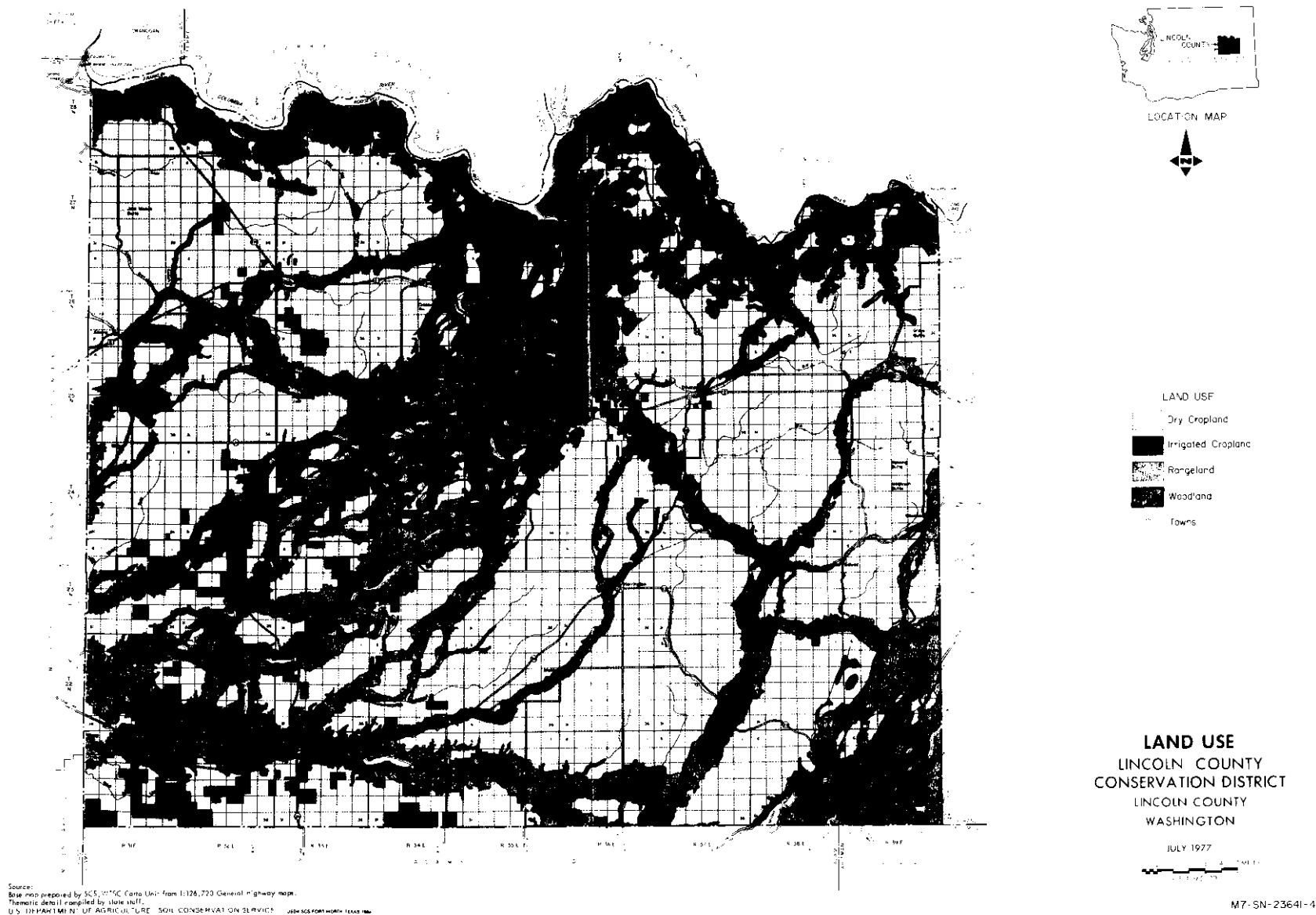


Figure 2. Land use within proposed project and vicinity.

Soils

Soils of the area were classified and mapped by the U.S. Department of Agriculture (USDA, 1980). They were formed either in loess on uplands or formed in loess over basalt, rock outcrops, or on basalt plateaus. Three general soil types occur within the project area: Bagdad, Roloff-Bakeoven-Rock outcrop, and Anders-Bakeoven-Rock outcrop.

Bagdad soils cover approximately 10 percent of the project area and are used as non-irrigated cropland. They are very deep, typically to a depth of 60 inches or more.

The largest portion of the project area is comprised of the Roloff-Bakeoven-Rock outcrop soil type. These soils range from very shallow to moderately deep (5 to 23 inches) and are used mainly as rangeland. In a few areas non-irrigated crops are grown on these soils, as is sprinkler-irrigated hay.

Anders-Bakeoven-Rock outcrop soils also range from very shallow to moderately deep (5 to 28 inches). They are used mainly as rangeland and are occasionally planted to non-irrigated crops. In a few areas, irrigated hay is grown.

Climate

Lincoln County lies in the rain shadow of the Cascade Mountains. The semi-arid climate includes winters that are cold, but generally not too severe. Summers in this area are hot during the day and cool at night.

The average daily minimum temperature in winter is 22 degrees F and the average daily maximum temperature in summer is 84 degrees F.

Precipitation ranges from 10 to 16 inches with 70 percent composed of snow. Prevailing winds are from the southwest (USDA, 1980).

General Wildlife/Habitat Type Descriptions

Wildlife resources within the project area consist of mammals, birds, and reptiles. Major mammal groups include deer, furbearers, and rodents. Major bird groups include native and introduced upland species, song birds, and raptors. Reptiles and amphibians are represented by snakes, turtles, and frogs (USFWS, 1985).

Numerous threatened and endangered or sensitive wildlife species frequent the area and may benefit from mitigation measures (bald eagle and Peregrine falcon). Both sharp-tailed grouse and sage grouse--the focus of this mitigation effort--are state and Federal candidate species for classification as threatened and endangered status.

Wildlife distribution depends on the presence or absence of suitable habitat. Wildlife habitat is defined by cover type. Cover type is the variety and relative abundance of plants found within a defined area and the type of cover the plants provide for wildlife. Two general cover types exist within the project area: shrub-steppe and agriculture.

Shrub-steppe

Approximately 90 percent of the project area consists of the shrub-steppe/grassland cover type. Big sagebrush is the primary shrub species.

Other shrub species present include three-tipped sagebrush, rabbitbrush, greasewood, bitterbrush, chokecherry, serviceberry, and currant. The primary grass species include Idaho fescue, blue-bunch wheatgrass, needle and thread, cheatgrass, Sandberg's bluegrass, and wild rye. Forbs in this cover type include buckwheat, yarrow, balsamroot, and tumbling mustard.

Typical wildlife species found in the shrub-steppe cover type include black-tailed jackrabbit, white-tailed jackrabbit, Nuttall's cottontail rabbit, mule deer, white-tailed deer, badger, coyote, and northern pocket gopher. Other species include sharp-tailed and sage grouse, pygmy rabbit, Swainson's hawk, Merriam's shrew, and sagebrush vole. In areas that have rock outcrops, species such as bobcat, bushy-tailed woodrat, rattlesnake, rock wren, and yellow bellied marmot may be present; while in grasslands, the grasshopper sparrow and burrowing owl occur.

Where shrub-steppe is found adjacent to croplands, pheasants, Hungarian partridge, and California quail are likely to exist. Waterfowl will also nest in shrub-steppe as long as suitable brood-rearing habitat is present.

Riparian

Riparian habitat was included as a component of the shrub-steppe cover type. It typically occurs along creek bottoms, lakes, ponds, and ephemeral wet areas.

Two types of riparian habitat occur within the project area: grass/forb and shrub/tree. They are distinguished from one another by the presence or absence of shrubs and/or trees.

Where both shrubs and trees are absent, the area is classified as grass/forb (Figure 4), or emergent wetland (Figure 5). The grass/forb classification includes reed canary grass, Russian thistle, smartweed, and members of the phlox family, while emergent wetlands are characterized by herbaceous hydrophytes such as cattail, hard-stem bulrush, cordgrass, salt-grass, coontail, pondweed, and water milfoil.

The shrub/tree areas (Figure 6) are comprised of rose, dogwood, hawthorne, willow, aspen, water birch, alder, cottonwood, serviceberry, and chokecherry.

Wildlife species found in the grass/forb riparian areas include ringneck pheasant, mallard, cinnamon teal, geese, snipe, killdeer, Northern harrier, striped skunk, harvest mice, meadow vole, raccoon, coyote, muskrat, and beaver.

Waterfowl common to emergent wetlands include the mallard, pintail, Canada goose, coot, blue winged teal, green winged teal, and cinnamon teal. Shorebirds include avocet, Wilson's phalarope, least sandpiper, and lesser yellow-leg, while songbirds such as red-winged blackbird and song sparrow are also present.

Western painted turtle are also found in emergent wetlands along with mammals such as beaver, muskrat, mink, and long-tailed weasel.

Wildlife species commonly found within the shrub/tree riparian complex include song sparrow, great blue heron, tree frog, junco, red-tailed hawk, California quail, ringneck pheasant, raccoon, muskrat, beaver, white-tailed deer, and coyote.

Agriculture

The agriculture cover type (Figure 7) comprises approximately 10 percent of the project area. Wheat, barley, and alfalfa hay are the primary dryland crops. Recently, implementation of the USDA's Conservation Reserve Program (CRP) has resulted in a reduction of the amount of dryland crop acreage and an increase in perennial grass fields within the proposed project area. This may benefit wildlife in the short term.

Wildlife species that occur in the dryland farmed areas include Great Basin pocket mice, deer mice, northern pocket gopher, badger, Nuttall's cottontail rabbit, meadowlark, horned lark, barn swallow, ringneck pheasant, Hungarian partridge, Canada goose, and several dabbling duck species. Where there is suitable adjacent shrub-steppe habitat, mule deer and white-tailed deer may also be present.

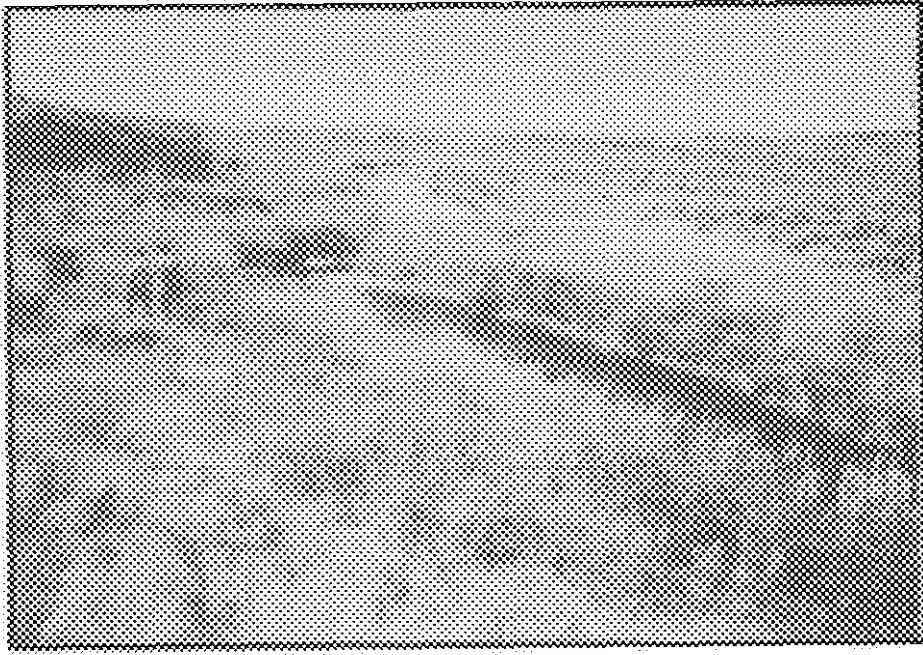


Figure 4. Grass/Forb, riparian habitat example.



Figure 5. Emergent wetland, riparian habitat example.



Figure 6. Shrub/Tree, riparian habitat example.

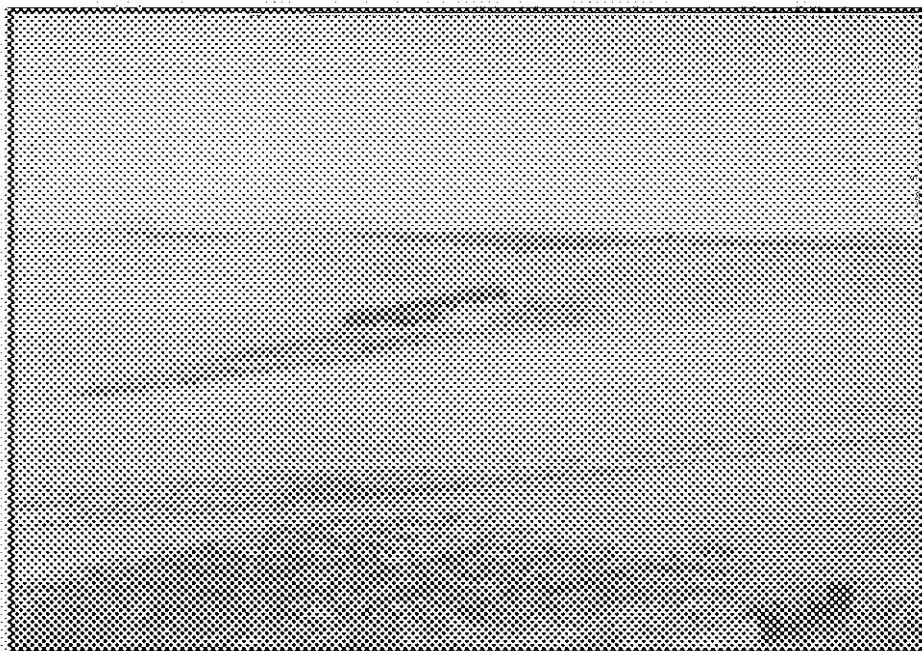


Figure 7. Agricultural cover type example.

HABITAT EVALUATION

A Habitat Evaluation Procedure (HEP) analysis was performed to determine base line habitat conditions and to estimate the number of potential habitat units (HUs) protected by purchasing perpetual conservation easements or buying lands in fee.

Sharp-tailed grouse, sage grouse, pygmy rabbits, and mule deer were selected as indicator species to represent shrub-steppe dependent wildlife. Unpublished HEP models (Appendix C) were developed to reflect local habitat conditions. WDW wildlife biologists identified poor nesting and brooding habitat as the primary factor limiting prairie grouse populations in the Tracy Rock area. Therefore, the sharp-tailed and sage grouse nesting and brooding HEP models were emphasized during the field evaluations.

An inter-disciplinary HEP team (Appendix D) evaluated habitat conditions based on the habitat variables within species models. The field team estimated habitat variables using ocular measurement techniques. Direct measurements were also obtained and compared with the ocular estimates whenever possible. Base line habitat conditions were estimated on four sites within the proposed project area. Transect sites were randomly selected and replicated. Results of the HEP evaluation can be found in Appendix E.

Even though the HEP process was used to determine the initial loss assessments for Grand Coulee Dam and subsequent base line habitat estimates for the Tracy Rock area, future mitigation crediting, monitoring, and evaluations may be accomplished on an acre-for-acre basis, or other suitable measure, instead of a habitat-unit basis.

SHARP-TAILED GROUSE BIOLOGY AND MANAGEMENT OBJECTIVES

Distribution/Current Status/Limiting Factors

Sharp-tailed grouse populations have declined considerably in Washington since the turn of the century. The primary factors responsible for the decline of these species are the conversion of native shrub-steppe habitat for agricultural purposes, construction of hydropower facilities, fragmentation of existing habitats, overgrazing, and tree removal from riparian areas (Yokum, 1952; Ziegler, 1979).

Conversion of native shrub-steppe/grasslands to crops, coupled with heavy livestock grazing and fragmentation of the remaining rangelands, has significantly reduced the amount and quality of shrub-steppe habitat throughout Eastern Washington (Figure 8). As a result, shrub-steppe dependent wildlife species such as sharp-tailed grouse currently occupy only a fraction of their former range (Figure 9).

The sharp-tailed grouse originally occupied prairie habitats in nearly every county in eastern Washington. However, by the early 1950s their range had been reduced to scattered populations in unfarmable scablands (Yokum, 1952). In 1979 Ziegler reported that sharp-tailed grouse range had been further reduced to central Okanogan, north Douglas, and central Lincoln counties. Sharptailed grouse are also found on the Colville Indian Reservation where their status is largely unknown.

Sharp-tailed grouse are now a State and Federal candidate species for classification as threatened or endangered status. Therefore, it is important to provide timely protection and enhancement for this species to avoid federal classification under the Endangered Species Act and improve overall population health within Lincoln County.

Areas that continue to support the most viable populations, based on breeding ground attendance, include the area around West Foster Creek, East Foster Creek, and Dyer hill in Douglas County; the area around Tracy Rock and Swanson Lake in Lincoln County; and the Scotch Creek/Johnson Creek/Happy Hill area, the Tunk Valley, and near the town of Chesaw in Okanogan County.

In addition to habitat conversion for agricultural purposes, another limiting factor that has been identified by other states is fire control. Wildfires maintained grasslands and brush habitat that sharp-tails require rather than allowing coniferous trees to dominate the landscape (Kessler and Bosch, 1981; Hamerstrom et al., 1957.). This is a possible factor in Washington where sharp-tailed grouse habitats occur in transition zones between sage brush/grasslands and forested types.

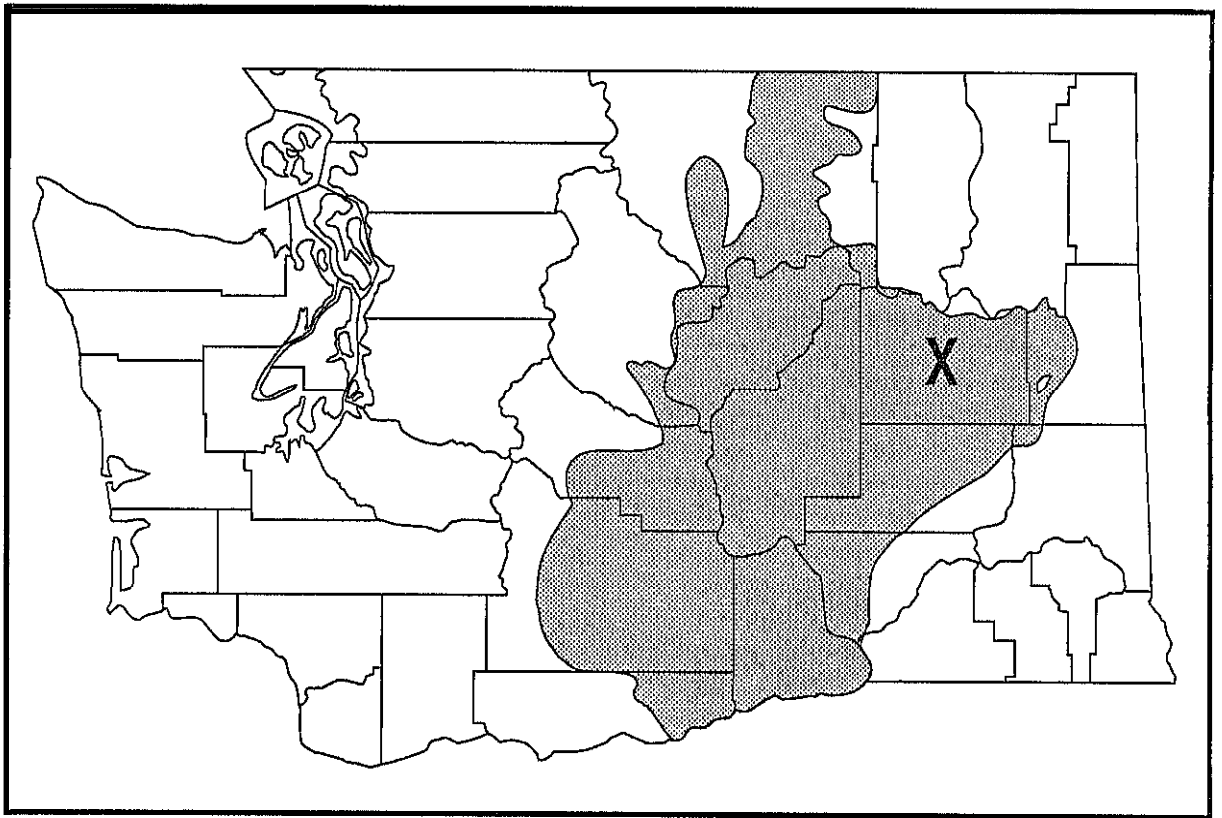


Figure 8a. Original range of Washington shrub-steppe habitat,

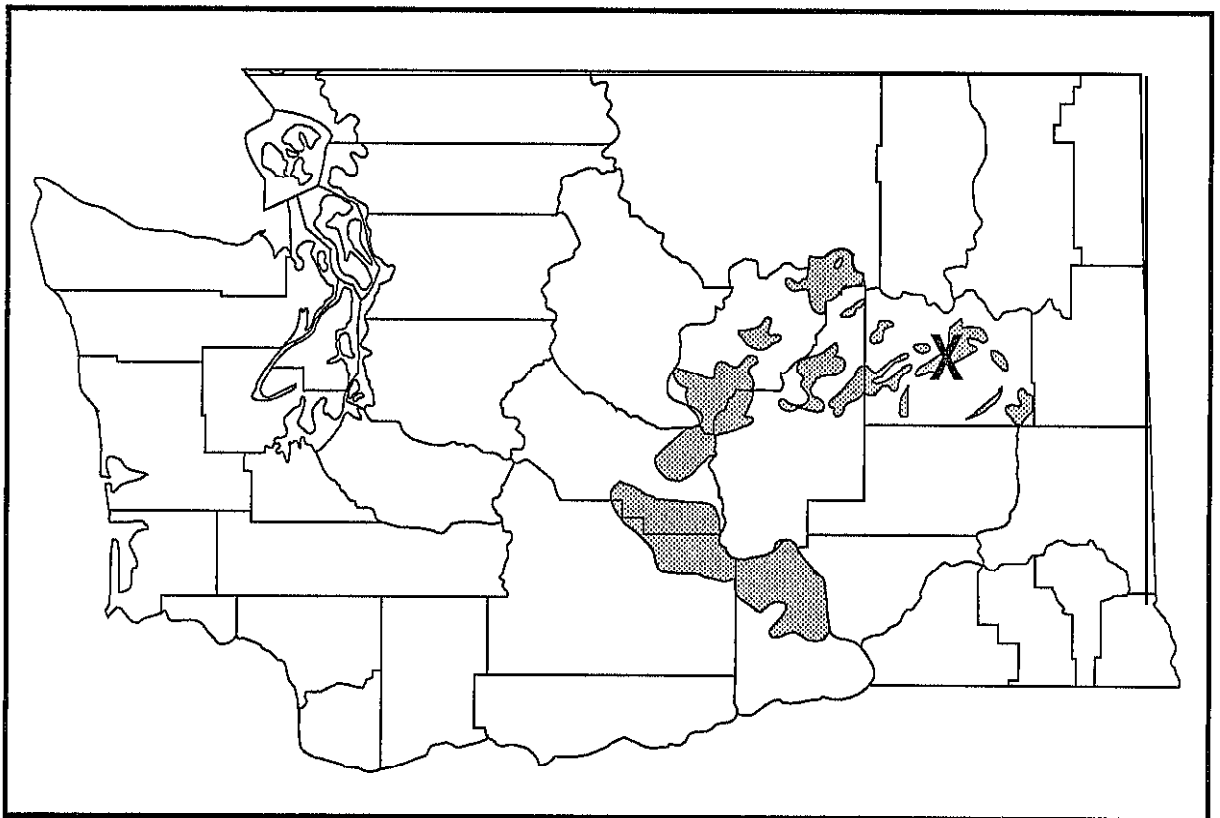


Figure 8b. Current range of Washington shrub-steppe habitat.

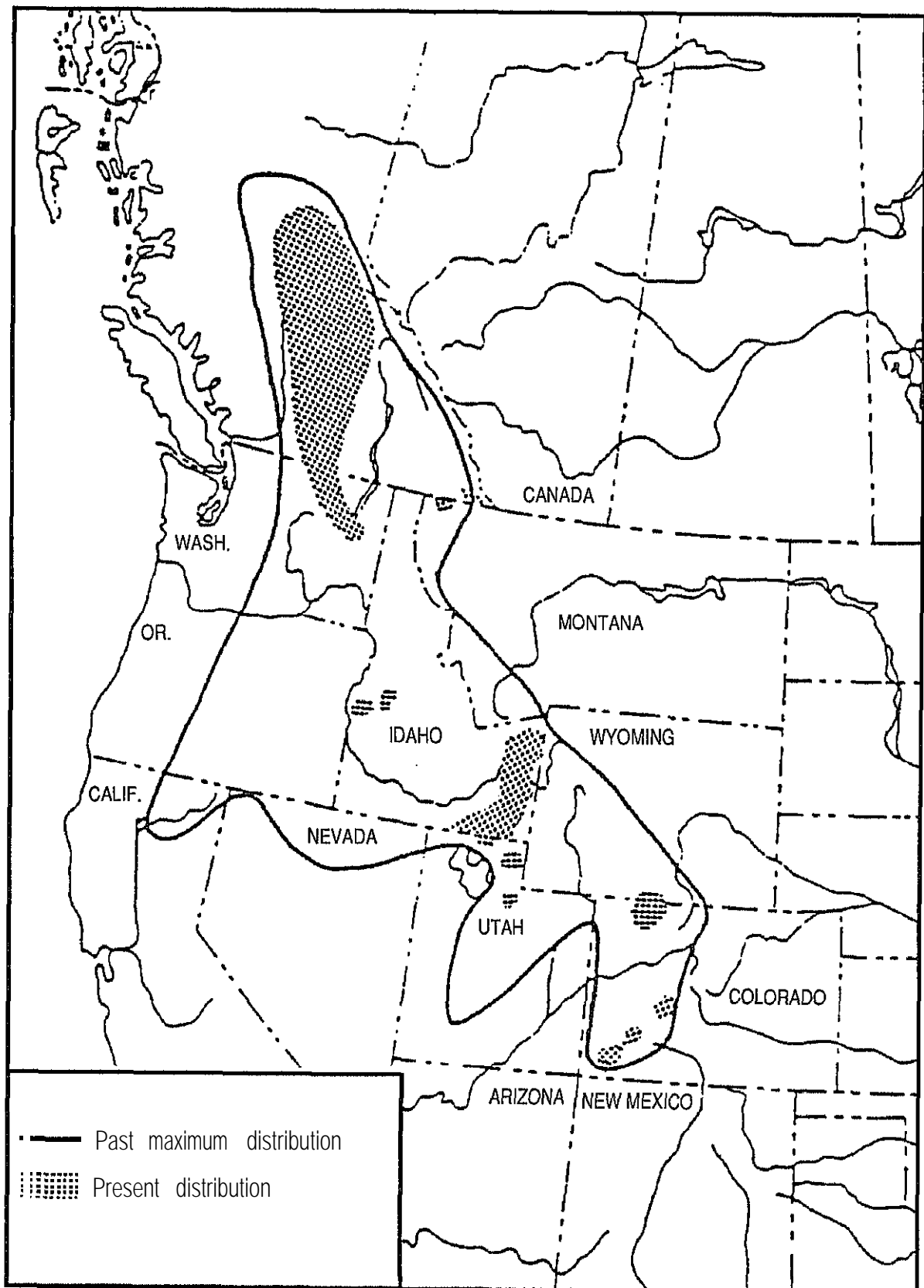


Figure 9. Past and present distribution of Columbian sharp-tailed grouse (Meintz et. al., 1991).

Life History

The Columbia sharp-tailed grouse subspecies begin to congregate around their breeding grounds, known as leks, as soon as the snow recedes in March. Males establish territories on the leks that are defended from other males.

Typically, the central portion of the lek site is where the older, more aggressive grouse select territories. These older birds usually do most of the breeding (Johnsgard, 1973).

The females begin to arrive on the breeding grounds shortly after the males. Peak attendance in Washington occurs in the middle to latter part of April.

The males perform a display ritual often described as a dance. The purpose of the ritual is to attract a female for breeding. Once bred, the female leaves the lek and continues the nesting process (Johnsgard, 1973).

The hen will lay about one egg per day until she completes a clutch of 12 eggs. The incubation period averages 23 days. Additional nests will be attempted if the initial nest is destroyed (Giesen, 1987; Johnsgard, 1973). Nest success is usually greater than 50 percent, and five to six young survive per brood. Once the chicks are ten to 12 weeks old, they become fairly independent and the broods often disperse.

By fall, sharp-tails can often be found back near the lek with males beginning to establish territories. As winter arrives, large flocks are formed and the birds move to available food sources (Johnsgard, 1973).

Habitat Requirements

In Washington sharp-tailed grouse inhabit sagebrush-grasslands or mountain shrub habitats. Important vegetation includes bunchgrass, sagebrush, snowberry, service berry, and water birch (Giesen, 1987; Ziegler, 1979; Artmann, 1970).

Leks or dancing grounds are typically located on a knoll in rolling terrain or a flat spot in channelled scablands. The vegetation at the lek site will usually be sparse (Ziegler, 1979; Johnsgard, 1973; Sisson, 1971; Jones, 1966). These characteristics allow for a conspicuous display area for birds to gather and breed (Johnsgard, 1973). The lek is the focal point for a local population of sharp-tailed grouse and most other annual activities are conducted within two or three miles of the lek. The annual home range can be much smaller when all of the habitat needs of the birds are met in a small area.

Sharp-tails usually select vast areas of tall, dense grass within a few miles of the lek for nesting. Most nests are located under the cover of the previous year's growth of grass or concealed under shrubs (Kohn, 1976). Hofmann and Dobler (1988) noted that sharp-tails typically selected north slopes for nesting. These slopes usually consist of taller, more dense vegetation because of better soil moisture that results from the shaded aspect.

Brooding cover contains higher percentages of brush and broadleaf plants than nesting cover (Klott and Lindzey, 1990). In addition to foraging on large amounts of broadleaf plants, young chicks eat a significant amount of insects. High insect densities occur in areas with large numbers of broadleaf plants. As the summer progresses, sharp-tails tend to move to riparian areas or mountain shrub communities to search for green succulent vegetation, ripening berries, and shade.

Winter habitats also include mountain shrub communities and riparian areas where berries, seeds, and buds can be found for food. A variety of habitats are used until snow forces the birds into taller vegetation. Sharp-tails will burrow into snow to roost and escape from harsh weather; however, crusted snow conditions cause them to roost in trees and shrubs.

Studies on food habits of sharp-tailed grouse show a high use of grasses and forbs in spring, summer, and fall. Insects mostly beetles and grasshoppers, are most heavily utilized in summer and fall. Grains will often be eaten in the fall and winter until covered by snow. In winter the birds primarily eat buds and fruits of various trees and shrubs, with waterbirch being most heavily used in Washington.

Important food sources include buttercup, Sandberg bluegrass, dock, balsomroot, lupine, dandelion, clover, sunflower, china lettuce, salsify, bunchgrass, chokecherry, serviceberry, aspen, willows, cottonwoods, and waterbirch.

Habitat Management

Conversion of shrub-steppe/grassland habitat to agricultural crops, coupled with intensive livestock grazing and the degradation of riparian areas, have resulted in sharp-tailed grouse population declines in recent years. Land management practices aimed at enhancing conditions for prairie grouse must address those three factors.

Management of Agricultural Areas

The conversion of land from native habitats to agriculture should be curtailed in areas specifically managed for sharp-tails. In addition, native vegetation should be reestablished on croplands included within mitigation efforts. This could be done by compensating private landowners, enrolling or extending contracts in the USDA's CRP, or purchase via perpetual easements or fee title.

The revegetation of croplands should include seeding with a high percent (40% - 50%) of forbs and a combination of the perennial grasses listed previously. A variety of grasses, forbs, and shrubs are needed by sharp-tails to satisfy habitat needs throughout the year. Annual grasses and noxious weeds such as cheatgrass and knapweed may be detrimental to grouse because they compete with more important vegetation. Weed control measures and vegetation management should focus on reducing the dominance of these weeds in the landscape.

Management of Grazing Areas

Several authors have documented the degradation of habitat that accompanies livestock grazing. Some recommend the use of fire rather than grazing to maintain vigorous stands of grasses and forbs. Light grazing can be used to manage vegetation, but must often be combined with other techniques.

Most of the shrub-steppe habitat in Washington has been intensively grazed since the late 1800s. Habitat that is managed for sharp-tailed grouse may initially require a no-grazing regimen in order to allow the vegetation to recover sufficiently for sharp-tailed grouse use. In some areas range seedings may also be needed to improve the ecological condition of rangelands that have been severely overgrazed by livestock.

Grazing could be resumed once the vegetation has recovered enough to meet the needs of the grouse. Most studies indicate that a rest-rotation grazing system provides the most benefits to sharp-tails. Pastures managed for grouse should be rested more often than they are grazed or, at most, grazed in alternating years. Grazing will only be used when found to be consistent with the biological needs of the grouse.

Tall, dense, residual grass cover is important to nesting grouse. Sharp-tails avoid areas that have been heavily grazed or that are being grazed before and during nesting season. Residual grasses should be at least 12 inches tall and uniform over large areas. Several authors used visual obstruction readings (VOR) to determine habitat selection for nesting. Robel, et al. developed the most commonly used VOR technique. An average minimum VOR of two (or pre-green-up value of one) results in high nest site selection and increased nesting success.

A VOR of greater than three is best for brooding grouse. This value is likely influenced by the selection of mountain shrub and mesic sites. A high forb (>20 percent) component is also important for providing high quality brooding habitat.

Management of Riparian Areas

Brush, shrubs, and trees that grow along streams and draws provide critical winter food for sharp-tails. Woodcutting, land clearing, herbicide drift, and livestock grazing have resulted in the loss of important winter habitat. In order to enhance an area for sharp-tails, existing winter food sources should be protected and new ones developed. Water birch, aspen, chokecherry, and serviceberry are the most important components. Two-acre clumps of winter habitat should be established at short intervals along streams, draws, and at springs.

General Management

Dancing grounds should not be disturbed to prevent abandonment by breeding grouse. Site visitations, construction, farm equipment, and grazing should be restricted from the area near leks from April through June.

Insecticides have caused death and behavior modification in adult grouse and have resulted in lower chick survival by reducing food availability. Herbicides cause similar problems of reduced food availability which results in lower chick survival and avoidance of the site by adults. The use of pesticides should be avoided or at least greatly restricted. Chemical control of pests should be the last resort.

Wildlife managers will employ adaptive management techniques in response to new information as a result of monitoring and evaluation efforts.

The following table lists WDW habitat standards and guidelines for sharp-tailed grouse.

Table 1. SHARP-TAILED GROUSE MANAGEMENT ZONE STANDARDS

HABITAT COMPONENTS FOR SHARP-TAILED GROUSE	GENERAL DESCRIPTION OF SHARP-TAILED GROUSE HABITAT COMPONENTS	OPTIMUM CONDITIONS OF SHARP-TAILED GROUSE HABITAT COMPONENTS
Lek Habitat (Sharp-tailed Grouse Dancing Ground)	Grassy flats or knolls with some bare ground in shrub-steppe zone; agricultural land used.	Same as general description.
Human Disturbance	Will not tolerate human presence.	No disturbance from March through April.
Nesting Habitat (Habitat within 1-mile of lek site)	Grasslands comprised of native and introduced grass species with shrubs and evergreen trees.	Native grassland plant communities; flat to gently rolling topography with north slopes.
Plant Species	Bluebunch wheatgrass, balsam root, sagebrush, water birch, lupine, bitterbrush, serviceberry, hawthorne	Same as general description.
Vegetative Structure and Cover	Gram that is 12 to 30-inches tall and retained throughout the year.	Greater than 70% of the ground covered by tall grasses, forbes and legumes.
Shrub Canopy	0-50% canopy coverage.	Less than 30%~canopy coverage.
Human Disturbance	Will not tolerate human presence.	No disturbance from December - June.
Winter Habitat Winter Feed/Cover	Clump.? of water birch, serviceberry, ha&home, aspen, mee and chokecherry for food and cover.	Undisturbed riparian areas with catkin/bud-producing trees and shrubs.
Distance of winter food habitat from Leks	0-5 miles.	Less than 1 mile.

Source: WDW Habitat Management Standards and Guidelines, 1990 (Draft)

Habitat and Population Monitoring

The WDW's current strategic and upland bird restoration plans call for increasing sharp-tailed grouse population levels as the primary objective for that species. Strategies include:

1. Habitat inventory and monitoring.
2. Developing enhancement techniques.
3. Coordination of mitigation projects; actions of land management agencies, and land use planning to enhance and protect habitat.
4. Working with private landowners to encourage sharptail habitat improvement and protection.
5. The acquisition and protection of critical habitat through fee purchase or perpetual conservation easements.
6. Improving basic knowledge of sharp-tail grouse habitat needs, population status, and monitoring techniques and data management.

A system to monitor whether habitat management objectives are being achieved is important to the development and implementation of a successful and cost-effective mitigation program. Initially, the vegetation of the area being managed should be mapped and measurements taken in each vegetation type. A subsample can be collected if the management area is large (refer to range monitoring for habitat measurement techniques).

General surveys (flushing transects) should be conducted to determine which wildlife species are currently using the site. Sharp-tailed grouse, which are the target species for management, need to be monitored to document the habitat types used. Basic information should also be gathered to determine annual production and survival. This will help determine management direction and add to information pertaining to life history requisites.

Base line information would be compared to values obtained in the literature providing a starting point for setting habitat management priorities and objectives. Vegetation characteristics should be measured before and after implementing habitat management practices to determine whether management objectives were being met.

The most common techniques used to monitor habitat characteristics for sharp-tailed grouse include the use of visual obstruction readings, percent frequency, and line intercept to determine shrub canopy cover.

Lek surveys should be continued to monitor sharp-tailed grouse on an annual basis to determine the relative health of the population. Telemetry must be used to document seasonal habitat use by sharp-tails. In this way, key habitat complexes can be identified and improved, and areas with similar potential can be located and enhanced. Birds with transmitters will also provide nest success and brood survival information that will help identify the type of habitat or management needed to increase populations.

New leks usually indicate expanding populations, and studies show that sharp-tails will quickly occupy new habitats.

Mitigation Objectives

The following mitigation objectives provide a framework from which implementation plans will be developed. The objectives focus on the biological/habitat requirements of sharp-tailed grouse and are consistent under both conservation easement and fee title strategies. An attempt was made to display a full range of actions that could be considered under different easement options.

Alternative 1 - Conservation Easements

- Objective 1: Protect, Maintain, and Enhance Leks
- Objective 2: Protect and Enhance Nesting Habitat
- Objective 3: Maintain and Develop Winter/Riparian Habitat
- Objective 4: Design a Vegetative Management Plan
- Objective 5: Develop Wildlife Watering Facilities
- Objective 6: Control Wildfires
- Objective 7: Monitor Sharp-Tailed Grouse Populations
- Objective 8: Monitor Habitat Conditions
- Objective 9: Reestablish Sharp-Tailed Grouse Populations
- Objective 10: Provide Public Education

The actions associated with each objective follow.

Objective 1: Protect, Maintain, and Enhance Leks

- Actions:
- 1. Identify and document lek locations.
 - Locate and map lek locations. Regional WDW personnel will provide the locations of known leks.
 - 2. Exclude livestock grazing from March through June.
 - Fence leks, nesting, and brooding areas.
 - Apply appropriate grazing system if biologically consistent with management objectives.
 - Develop alternative livestock water facilities as required.
 - 3. Maintain the physical characteristics of leks.
 - Control wildfires and farming practices.
 - Protect from road development, mineral exploration, pipelines, etc.

- Mowing or other measures may be necessary to maintain the vegetative structure at leks; however, maintenance activities, that may include grazing, will not occur from March through June.
4. Control human disturbance.
 - Post restrictive access signs on project boundaries and provide enforcement as needed.
 - Develop pamphlets, brochures, and media campaign to educate the public.
 - Erect information boards on the project.
 - Develop a public viewing area/interpretive site at a lek.
 - Conduct scheduled field trip(s) to a lek site.
 5. Develop additional leks.
 - Manipulate the vegetation at potential lek sites.
 - Encourage the use of the developed lek(s) by providing sharp-tailed grouse decoys and mating vocalization tapes.

Objective 2: Protect and Enhance Nesting Habitat

Actions:

1. Identify and map nesting/brooding areas.
 - Utilize WDW, The Nature Conservancy (TNC), records and other data to identify leks.
 - Delineate nesting/brooding range on project maps.
 - Conduct vegetative transects to obtain base line habitat conditions.
2. Control livestock grazing.
 - Construct fences to exclude livestock from nesting and brooding areas.
 - Develop alternative water sources for livestock on uplands, if required.
 - Develop seasonal grazing management plan, if appropriate, to accomplish wildlife management/habitat development objectives.
3. Limit human disturbance on nesting/brooding areas.
4. Enhance habitat.
 - Reestablish indigenous vegetation on rangelands by seeding grasses, forbs, and legumes in areas exhibiting proper soil and moisture parameters.
 - Plant alfalfa and sweet clovers for insect production and forage as an interim measure while native vegetation is being established.
 - Control noxious weeds and other competitive vegetation, as needed.
 - Replant wet meadows with native riparian vegetation.
 - Protect existing and developed riparian areas with additional fencing if livestock grazing is allowed.
 - Renovate existing ephemeral ponds, and develop new ponds 1/2 to 3 acres in size.

Objective 3: Maintain and Develop Winter/Riparian Habitat

Actions:

1. Protect existing winter/riparian habitat.
 - Fence areas containing aspen, waterbirch, rose, choke-cherry, serviceberry, willow, hawthorn, and cottonwoods to promote regeneration of saplings and to increase shrub/tree vigor and growth.
 - Protect from indiscriminate burning and herbicide applications.
 - Construct livestock shade shelters on adjacent uplands if required.
 - Develop livestock watering facilities, i.e., pipe water to troughs, provide limited access to ponds and springs, and/or drill wells as needed.
 - Restrict access to wintering areas.
2. Enhance winter/riparian habitat.
 - Plant pockets of indigenous shrubs and trees; examples are aspen, waterbirch, hawthorne, chokecherry, and serviceberry in riparian areas and other suitable locations throughout the project area, i.e., south exposures, etc.
 - Plantings should not exceed 1/4 mile intervals and be no larger than two acres in size on dryland sites and as large as practical in riparian areas.
 - Drip irrigate new plantings until established.
 - Control noxious weeds and competing vegetation at enhancement sites.
 - Maintain plantings as appropriate.

Objective 4: Design a Vegetative Management Plan

Actions:

1. Manage/manipulate habitat to meet wildlife management objectives.
 - Determine base line habitat conditions.
 - Identify optimum seasonal habitat conditions required by sharp-tailed grouse.
 - Determine the type and level of seasonal use, as needed, to accomplish management plan objectives for sharptailed grouse.
 - Design pastures to include shade and water for livestock if grazing is allowed.
 - Coordinate grazing dates with cattle ranchers if grazing is permitted.
 - Enforce grazing allotments and grazing dates.
 - Schedule fence maintenance checks (WDW is responsible for fences).
 - Adjust management plans to reflect changes needed to attain wildlife management goals.

2. Monitor impacts of grazing on habitat.
 - Conduct vegetative transects.
 - Adjust grazing plans to reflect changes needed to attain wildlife management goals.
 - Enforce grazing allotments and grazing dates.

Objective 5: Develop Wildlife Watering Facilities

- Actions:
1. Ensure that permanent and seasonal water sources are available throughout the project area.
 - Survey and document the locations of ephemeral riparian areas, marshes, streams, lakes, ponds, river, springs, wells, and dugouts.
 - Deepen/enlarge existing dry ponds.
 - Develop and/or fence springs.
 - Drill wells.
 - Fence all riparian areas.
 - Divert livestock to uplands, if appropriate, by providing watering facilities to cattle displaced by riparian protection measures.

Objective 6: Control Wildfires

- Actions:
1. Control range fires.
 - Prohibit campfires, etc. on project lands.
 - Coordinate wildfire control activities with landowners, and federal, state, and county entities.
 2. Reduce the amount of ground litter.
 - Conduct controlled burns.
 - Manage livestock grazing if consistent with wildlife management objectives.
 - Utilize mechanical manipulation.

Objective 7: **Monitor** Sharp-Tailed Grouse Populations

- Actions:
1. Monitor leks.
 - Document lek use by sharp-tails during spring and fall display periods.
 2. Monitor the number of satellite leks.
 - Conduct surveys during March and April.
 3. Conduct nesting and brood production surveys.
 - Request assistance from landowners, volunteers, and WDW field personnel.
 4. Conduct fall population counts.
 - Utilize volunteers/bird dogs.
 - Request observation information from landowners and hunters.

5. Identify key wintering habitats.
 - Conduct winter transects throughout project area.
 - Conduct winter surveys on areas of suitable habitat adjacent to project lands.
 - Document and map the locations of key wintering areas.
 - Record the number of sharp-tailed grouse observed at each site.
6. Monitor response of grouse populations to habitat management/manipulation practices.
 - Conduct base year population surveys, followed by replicate transects.
7. Capture sharp-tails and attach radio transmitters to determine seasonal movements and document habitat use.

Objective 8: Monitor Habitat Conditions

- Actions:
1. Conduct vegetative transects at lek sites, nesting areas, and on winter ranges.
 - Determine base year conditions on seasonal habitats.
 - Monitor habitat changes resulting from grazing and habitat management practices on an annual and/or seasonal basis.
 2. Compare vegetative survey results with management objectives.
 3. Modify management plans as needed to ensure objectives are met.
 4. Document satellite leks.
 - Conduct surveys during display periods to locate new leks.

Objective 9: Reestablish Sharp-Tailed Grouse Populations

- Actions:
1. Augment existing populations.
 - Locate a genetically compatible population, i.e., British Columbia, Canada, and Idaho.
 - Establish release pens, etc. at project site(s).
 - Obtain sharp-tailed grouse.
 - Radio tag grouse.
 - Release grouse and monitor.
 2. Reestablish new populations on project lands.
 - Locate a genetically compatible population, i.e., British Columbia, Canada, and Idaho.
 - Establish release pens, etc. at project site(s).
 - Obtain sharp-tailed grouse.
 - Radio tag grouse.
 - Release grouse and monitor.

Objective 10: Provide Public Education

- Actions:
1. Educate the agricultural community, cattle industry, and general public regarding the uniqueness of sharp-tailed grouse and mitigation objectives.
 - Draft articles for the news media and other publications.
 - Conduct public outreach meetings.
 - Present lectures to local schools and other organizations.
 2. Erect interpretive boards at project sites as appropriate.
 3. Develop brochures, posters, slide and video presentations concerning sharp-tailed grouse and shrub-steppe ecosystems.
 4. Develop interpretive center on project site.

Alternative 2 - Fee Title Acquisition

- Objective 1: Protect, Maintain, and Enhance Leks
- Objective 2: Protect and Enhance Nesting Habitat
- Objective 3: Maintain and Develop Winter/Riparian Habitat
- Objective 4: Design a Vegetative Management Plan
- Objective 5: Develop Wildlife Watering Facilities
- Objective 6: Control Wildfires
- Objective 7: Monitor sharp-tailed grouse Populations
- Objective 8: Monitor Habitat Conditions
- Objective 9: Reestablish Sharp-Tailed Grouse Populations
- Objective 10: Provide Public Education

The actions associated with each objective follow.

Objective 1: Protect, Maintain, and Enhance Leks

- Actions:
1. Identify and document lek locations.
 - Locate and map lek locations. Regional WDW personnel will provide the locations of known leks.
 2. Maintain the physical characteristics of leks.
 - Control wildfires and farming practices.

- Protect from road development, mineral exploration, pipelines, etc.
 - Mowing or other measures may be necessary to maintain vegetative structure at leks; however, maintenance activities including grazing will not occur from March through June.
3. Control human disturbance.
 - Post restrictive access signs on project boundaries and provide enforcement, as needed.
 - Develop pamphlets, brochures, and media campaign to educate the public.
 - Erect information boards on the project.
 - Develop a public viewing area at a lek site.
 - Conduct scheduled field trip(s) to a lek site.
 - Fence project boundaries with color-coded fence posts to identify project lands end to reduce potential trespass problems on adjacent lands.
 4. Develop additional leks.
 - Manipulate the vegetation at potential lek sites.
 - Encourage the use of developed lek(s) by providing sharp-tailed grouse decoys and mating vocalization tapes.

Objective 2: Protect and Enhance Nesting Habitat

Actions:

1. Identify and map nesting/brooding areas.
 - Utilize WDW, TNC, records and other data to identify leks.
 - Delineate proposed nesting/brooding range on project maps.
 - Conduct vegetative transects to obtain base line habitat conditions.
2. Preclude livestock grazing.
 - Construct fences to exclude livestock from nesting and brooding areas.
 - Exclude all grazing for a minimum two-year rest period to facilitate range recovery and to allow for development and implementation of habitat management/manipulation strategies.
3. Limit human disturbance on nesting/brooding areas.
4. Enhance habitat.
 - Reestablish indigenous vegetation on rangelands by seeding grasses, forbs, and legumes in areas exhibiting proper soil end moisture parameters.
 - Plant alfalfa and sweet clovers for insect production and forage as an interim measure while native vegetation is being established.
 - Control noxious weeds and other competitive vegetation as needed.
 - Replant wet meadows with native riparian vegetation.

- Protect existing and developed riparian areas with additional fencing if livestock grazing is allowed.
- Renovate existing ephemeral ponds, and develop new ponds 1/2 to 3 acres in size.

Objective 3: Maintain and Develop Winter/Riparian Habitat

Actions:

1. Protect existing winter/riparian habitat.
 - Fence areas containing aspen, waterbirch, rose, choke-cherry, serviceberry, willow, hawthorne, and cottonwoods to promote regeneration of saplings and to increase shrub/tree vigor and growth.
 - Protect from indiscriminate burning and herbicide applications.
 - Restrict access to wintering areas.
2. Enhance winter/riparian habitat.
 - Plant pockets of indigenous shrubs and trees; examples are aspen, waterbirch, hawthorne, chokecherry, and serviceberry in riparian areas and other suitable locations throughout the project area, i.e., south exposures, etc.
 - Plantings should not exceed 1/4 mile intervals and be no larger than two acres in size on dryland sites and as large as practical in riparian areas.
 - Drip irrigate new plantings until established.
 - Control noxious weeds and competing vegetation at enhancement sites.
 - Maintain plantings as appropriate.

Objective 4: Design a Vegetative Management Plan

Actions:

1. Manage/manipulate habitat to meet wildlife management objectives.
 - Determine base line habitat conditions.
 - Identify optimum seasonal habitat conditions required by sharp-tailed grouse.
 - Determine the type and level of seasonal use, as needed, to accomplish management plan objectives for sharptailed grouse.
 - Design pastures to include shade and water for livestock if grazing is allowed.
 - Coordinate grazing dates with cattle ranchers if grazing is permitted.
 - Enforce grazing allotments and grazing dates.
 - Schedule fence maintenance checks (WDW is responsible for fences).
 - Adjust management plans to reflect changes needed to attain wildlife management goals.

2. Monitor impacts of grazing on habitat.
 - Conduct vegetative transects.
 - Adjust grazing plans to reflect changes needed to attain wildlife management goals.
 - Enforce grazing allotments and grazing dates.

Objective 5: Develop Wildlife Watering Facilities

- Actions:
1. Ensure that permanent and seasonal water sources are available throughout the project area.
 - Survey and document the locations of ephemeral riparian areas, marshes, streams, lakes, ponds, rivers, springs, wells, and dugouts.
 - Deepen/enlarge existing dry ponds.
 - Develop and/or fence springs.
 - Fence all riparian areas.
 - Divert livestock to uplands, if appropriate, by providing watering facilities to cattle displaced by riparian protection measures.

Objective 6: Control Wildfires

- Actions:
1. Control range fires.
 - Prohibit campfires, etc. on project lands.
 - Coordinate wildfire control activities with federal, state, and county entities.
 2. Reduce the amount of ground litter.
 - Conduct controlled burns.
 - Manage livestock grazing.
 - **Utilize** mechanical manipulation.

Objective 7: Monitor Sharp-Tailed Grouse Populations

- Actions:
1. Monitor leks.
 - Document lek use by sharp-tails during spring and fall display periods.
 2. Monitor the number of satellite leks.
 - Conduct surveys during March and April.
 3. Conduct nesting and brood production surveys.
 - Request assistance from landowners, volunteers, and WDW field personnel.
 4. Conduct fall population counts.
 - Utilize volunteers/bird dogs.
 - Request observation information from landowners and hunters.

5. Identify key wintering habitats.
 - Conduct winter transects throughout project area.
 - Conduct winter surveys on areas of suitable habitat adjacent to project lands.
 - Document and map the locations of key wintering areas.
 - Record the number of sharp-tailed grouse observed at each site.
6. Monitor response of grouse populations to habitat management/manipulation practices.
 - Conduct base year population surveys, followed by replicate transects.
7. Trap and attach radio transmitters to a sample population to determine seasonal movements and document habitat use.

Objective 8: Monitor Habitat Conditions

- Actions:
1. Conduct vegetative transects at lek sites, nesting areas, and on winter ranges.
 - Determine base year conditions on seasonal habitats.
 - Monitor habitat changes resulting from grazing and habitat management practices on an annual and/or seasonal basis.
 2. Compare vegetative survey results with management objectives.
 3. Modify management plans as needed to ensure objectives are met.
 4. Document satellite leks.
 - Conduct surveys during display periods to locate new leks.

Objective 9: Reestablish Sharp-Tailed Grouse Populations

- Actions:
1. Augment existing populations.
 - Locate a genetically compatible population, i.e., British Columbia, Canada, and Idaho.
 - Establish release pens, etc. at project site(s).
 - Obtain sharp-tailed grouse.
 - Radio tag grouse.
 - Release grouse and monitor.
 2. Reestablish new populations on project lands.
 - Locate a genetically compatible population, i.e., British Columbia, Canada, and Idaho.
 - Establish release pens, etc. at project site(s).
 - Obtain sharp-tailed grouse.
 - Radio tag grouse.
 - Release grouse and monitor.

Objective 10: Provide Public Education

Actions:

1. Educate the agricultural community, cattle industry, and general public regarding the uniqueness of sharp-tailed grouse and mitigation objectives.
 - Draft articles for the news media and other publications.
 - Conduct public outreach meetings.
 - Present lectures to local schools and other organizations.
2. Erect interpretive boards at project sites as appropriate.
3. Develop brochures, posters, slide and video presentations concerning sharp-tailed grouse and shrub-steppe ecosystems.
4. Develop interpretive center on project site.

Mitigation Emphasis

The major activities of sharp-tailed grouse are conducted within two to four miles of leks. These zones are the most critical for immediate protection and enhancement. Nesting, brooding, and winter habitat should then be identified and measured to determine habitat quality and factors limiting populations. Limitations can be corrected through habitat enhancements and management. This will ensure maximum use and protection of controlled habitats, which in turn leads to maximum densities and protection of local sharp-tailed grouse populations.

New leks usually indicate expanding populations, and studies show that sharp-tails will quickly occupy new habitats. Therefore, the second priority after protection of existing lek zones is to enhance and control habitats within 10 to 20 miles of occupied leks. This would logically receive the highest priority in areas that historically contained sharptail habitat and populations.

Habitat enhancement would also be promoted through extension programs, land resource agencies, land use planning, and agriculture set-aside and conservation programs. Such efforts could effect large acreages. One reason such programs would be effective is the level of landowner acceptance that could be generated.

Substantial control of sharptail habitat is required for meaningful enhancements. Vegetation management for sharp-tails typically eliminates or greatly restricts common income-producing practices like grain production and livestock grazing. Land purchase and restrictive conservation easements are two techniques that can provide the level of control needed for habitat protection and enhancements. The use of perpetual conservation easements will be explored before pursuing fee title acquisition in order to provide protection and enhancement of key shrub-steppe habitats. Easement language to address the vegetative management needed by sharp-tailed grouse will need to be sufficiently restrictive, but flexible.

RANGE MANAGEMENT

Introduction

Managing habitat for sharp-tailed grouse in the Tracy Rock area may include using livestock grazing as one tool for achieving desired habitat enhancement objectives. If this management option is selected as the appropriate enhancement tool, livestock management plans will be developed within the context of site specific wildlife management objectives and to ensure/improve the ecological integrity of each site. In some cases, livestock grazing may be inconsistent with wildlife needs and precluded from consideration.

If grazing is seen as the best management option to create the desired habitat conditions, all ecological impacts must be considered prior to selecting a management plan that will produce the desired conditions on a site. This includes the effects of a program on non-target wildlife species and potential impacts to adjacent landowners, current grazing lease holders, and recreational users.

Leased public lands (federal or state owned) located within the project area may be included in site specific management plans. The WDW/BPA will coordinate with both the current lessee and the public agency responsible for management of the land before initiating any management agreement which could impact the current lessee's lease or land use options.

Federal and state owned rangelands currently within a "good" or "excellent" ecological condition may be sub-leased from the present lessee and managed to reflect wildlife habitat objectives. Other publicly-owned lands may undergo treatments to improve the ecological condition of the range and then leased back to private landowners for livestock grazing or other agricultural practices as required to meet wildlife management goals. The BPA will assist in relocation of lessees as stipulated by provisions within the Relocation Assistance Act.

Grazing may occur on lands protected by perpetual conservation easements or through fee title purchases; however, in either case the biological requirements/habitat needs of the sharp-tailed grouse will supersede all other uses. The remainder of this section will focus on defining range conditions, identifying grazing regimens, and adjusting animal-use-month levels.

Range Ecology

In general, a site in a "poor" ecological condition may have a plant community with no more than 25 percent of the plant cover characteristic of undisturbed, natural plant communities. A "fair" condition indicates that 26-50 percent of the present vegetation is characteristic of the potential natural plant community. "Good" condition represents 51-75 percent potential native vegetation while "excellent" means that 76-100 percent of the natural plant community is present.

Rangeland plant communities should be managed to reflect "good" or "excellent" ecological conditions.

Grazing Systems

Selective range management is a continuous process whereby annual livestock grazing allotments are based on:

1. Present range conditions
2. Site potential and the current plant community's potential for change
3. Wildlife habitat objectives
4. Resource use conflicts
5. Landowner desires
6. Grazing systems

A grazing treatment/system is the application of livestock grazing to a pasture at a specific intensity with specific timing in relation to the annual growth cycle of key range plant species. Specific elements of a grazing system include the season of use, livestock stocking rates, and range improvements and treatments needed to meet resource management objectives.

The type of grazing system to be implemented will be based upon the following considerations:

1. Wildlife habitat objectives
2. Vegetation potential and water availability
3. Season of use
4. Landowner needs
5. Implementation costs
6. Topography

There are six general treatments/systems. These include:

1. Early grazing - Grazing occurs prior to the beginning of the critical growth period. Livestock utilize primarily the previous year's growth. Some use of the new early green growth occurs.
2. Growing season grazing - Grazing occurs during the critical growing period, usually from April 1 until seed ripe for key grass species.
3. Deferred grazing - Grazing occurs after seed ripe and may include any period until growth begins next spring.
4. Winter grazing - Grazing occurs during late fall months while plants are dormant.
5. Rest rotation - Occurs on an area with multiple pastures where at least one pasture is left ungrazed for one year.
6. Rest grazing alternative - No grazing.

A grazing system may include one or more planned livestock grazing treatments to bring about change or maintain the composition of key plant species. Key species are those plants which serve as indicators of community stability and/or change and can be used to monitor objective accomplishments. Implementing grazing systems which allow key species to complete their growth cycles generally result in increases in or maintenance of those species. In the target area, the critical part of the growing season usually occurs from late March through June (Madsen, 1991).

Early Spring Grazing System

Grazing occurs early in late winter and/or early spring before the critical growing period for major perennial grass species. Early spring grazing maximizes the use of early maturing grasses that are not as palatable later in the season, such as cheatgrass and Sandberg bluegrass. The previous year's growth of perennial plants is also utilized. Under this regimen, grazing ceases while adequate soil moisture is available for continued plant growth. Therefore, most perennial plants are able to produce seed and replenish carbohydrate reserves. Early spring grazing would permit seeding establishment (Stoddart et.al., 1975) and may increase key herbaceous species composition.

Only very light utilization of upland woody species is expected under early spring grazing. Consequently, a long-term increase in composition of these species would likely occur in areas where a potential for increase exists as plant vigor and reproduction would be maintained. Key woody upland and herbaceous riparian vegetation should increase under this system as better distribution of livestock caused by cool weather, green upland forage, and maximum water sources promote dispersed grazing. Regrowth after grazing should occur with soil moisture remaining in both riparian areas and uplands.

Spring/Summer Grazing System

Grazing occurs each year during the critical part of the growing season. Stocking rates are designed to achieve levels of utilization on most areas. Rough terrain, location of fences and water, and the type of forage often prevents or limits uniform grazing patterns. Heavy grazing occurs on some portion of the range while light use often occurs in other areas.

A decrease in native upland herbaceous and woody species occurs within areas experiencing heavy grazing, primarily adjacent to water, riparian areas, and flat valley bottoms. Also, heavy grazing under a spring/summer system usually results in lowered plant vigor and a decrease in most key herbaceous and woody upland plants. If only the herbaceous understory is heavily grazed, lowering the competition and allowing woody seedlings to become established, shrubs often increase.

Moderate grazing levels may also reduce plant vigor, but the composition of most key species would be maintained. If grazing during critical growth periods reduces plant vigor, annuals or woody species will invade the stand.

Deferred Grazing System

The deferred system allows grazing after most of the key upland herbaceous species have reached the seed ripe stage and replenished carbohydrate reserves.

Moderate utilization of upland woody species encourages growth of additional twigs, if not grazed at the same time each year, resulting in increased forage production. Plant reproductive capacity is slightly decreased over time because increased twig growth discourages the development of flowers and fruits; however, long-term composition is not expected to change unless

heavy grazing occurs (1985 - BLM Resource Management Plan). Under the deferred grazing option, livestock will concentrate on accessible riparian areas in late spring and summer when the weather warms and plants begin to mature and go dormant, as green forage, shade, and water are available here. This concentration results in heavy utilization of riparian herbaceous and woody species alike. Woody riparian species will decrease because grazing occurs during the critical growth period for these species.

Winter Grazing System

Grazing occurs during late fall and winter months while range plants are dormant. Winter grazing encourages the use of shrubs which are more available and have a higher value in the winter than herbaceous species. (This may vary depending upon area, precipitation, snow depth, and amount of forage remaining after growth.)

This results in a decrease of the shrub component under moderate or heavy grazing pressure. Under light to moderate grazing, shrubs may actually increase as competition to seedling establishment may be reduced.

Since livestock grazing would cease prior to the initiation of herbaceous species growth, an increase in the composition of perennial forbs and grasses would result under all levels of livestock use unless heavy hoof action physically removes or dislodges perennial plant root crowns.

Deferred Rotation Grazing System

Under this system one or more years of grazing use during the critical growing period are alternated with a year or more of grazing after the seeds of the key herbaceous species ripen and carbohydrate reserves have been restored. At moderate grazing levels, an increase in key herbaceous species should occur. Under heavy utilization levels, root storage during the year of deferment may not be adequate to offset depletion that would occur during the year of use. If plant vigor is reduced significantly, it may take several years to recover when growth conditions are favorable. Herbaceous species composition would not be expected to change. Woody species composition in upland areas would not change significantly under moderate utilization but would decrease at heavy utilization levels unless at least two years pass between deferred treatments.

Impacts to woody and herbaceous vegetation in riparian areas are similar to those under a deferred grazing system.

Rest Rotation Grazing System

Rest rotation grazing alternates one or more years of complete rest with other treatments. The length of the rotation cycle and number of grazing treatments depend on site specific wildlife habitat management objectives and the number and size of pastures in the grazing system. A discussion regarding the three primary rest rotation grazing systems follows.

The first type of rest rotation alternates spring/summer grazing with rest. Herbaceous and woody upland plant communities will probably change in composition with any intensive grazing use, even with rest, because plants usually require several years to recover from heavy use. At light or moderate grazing levels, these species may increase in abundance. On the other hand, key species in riparian areas would remain at existing levels because the heavy utilization made on these plants would be offset by the year of rest.

The second type of rest rotation alternates early spring grazing one year with rest the next. This system has the advantages of an early spring grazing treatment every other year with the area rested on alternate years. No grazing occurs during the critical growing period.

The third rest rotation system alternates deferred grazing use one year after seed ripe with complete rest the next. Under this system, upland herbaceous species would not be grazed during the growing period. This should result in improved vigor, increased seed production, and possibly seeding establishment. However, livestock will tend to concentrate in wet areas and riparian zones during the grazing treatment year. Depending on the condition of the plant community and degree of grazing use of both herbaceous and woody plants, grazing impacts may not be overcome with one year of rest.

No Grazing Alternative

A permanent or temporary no-grazing policy may be adopted to protect critical wildlife habitat such as pygmy rabbit sites, sage sparrow habitat, and prairie grouse leks. The no-grazing policy does not preclude the application of alternative habitat/manipulation techniques.

Alternative habitat management/manipulation treatments will be applied in accordance with the objectives outlined within site specific management plans.

Adjustments to AUMs

Determining animal-use months (AUMs) requires the consideration of wildlife habitat objectives, forage production, and livestock management goals. Annual vegetative production will vary by range site and environmental conditions. Regardless of the amount of forage produced in any given year, sufficient reserves must remain after livestock grazing to provide for plant vigor, vegetative structure, and wildlife needs under the most severe environmental conditions.

Range conditions will be monitored to measure changes resulting from livestock grazing. AUMs will be adjusted accordingly to ensure that wildlife management objectives are met.

In order to ensure that grazing systems are compatible with current SCS technical guidelines and practices, WDW wildlife managers will consult with SCS range conservationists and landowners prior to implementing a grazing regimen.

summary

If consistent with wildlife management objectives, livestock grazing could be used as a tool to meet wildlife habitat objectives in some areas if properly applied and monitored. Likewise, grazing may be detrimental to key riparian and nesting habitats.

A limited, closely controlled grazing program might be used to enhance sharp-tailed grouse management on uplands within the Tracy Rock area; however, grazing moratoriums may be needed for several years to offset the impacts of drought and many years of continuous livestock use.

Years of livestock grazing at various intensities may have caused permanent changes to plant communities throughout the project area.

Invader plant species such as cheatgrass have replaced native grasses and forbs in many areas. As a result, grazing regimens and grazing moratoriums alone may not improve the ecological condition of rangelands.

Reseeding desirable rangeland vegetative species may be required, in addition to managing grazing, in order to improve rangeland habitat for sharp-tailed grouse.

WILDLIFE HABITAT AND POTENTIAL SITE DEVELOPMENTS

The following discussion focuses on the potential design of habitat manipulation practices, range improvements, and site development proposed in this plan. Additional design features, not specifically discussed in this section, will be included in site specific management plans.

Habitat development and range improvements will focus on maximizing benefits for wildlife and, whenever possible, will be consistent with applicable SCS technical standards, local conservation district mandates, and state/county land use designations. WDW wildlife managers will coordinate with SCS and conservation district technicians and landowners, if required, prior to implementing management activities.

SCS and conservation district technical assistance should be requested during the planning phase of all projects. Likewise, projects managed by other resource agencies should include WDW representation when such projects impact adjacent WDW efforts.

The following items will be discussed in this report:

1. Fences
 2. Water development
 3. Dug-outs and water holes
 4. Springs
 5. Existing water resources
 6. Vegetation manipulation practices
 7. Existing agricultural fields
 8. Brush control and enhancement measure
 - Burning
 - Chaining
 - Seeding
 - Shrub and tree plantings
 9. Information and regulatory signs
 10. Observation blinds
-
1. Fences will be constructed/maintained to delineate project boundaries, control livestock, protect wildlife habitat developments and riparian zones, establish parking and viewing areas, control access, and provide privacy and physical security for landowners residing within the project area.

Fences may be built with smooth wire or barbed-wire. Smooth wire is preferred because it is less detrimental to wildlife and can be electrified. Solar powered charging units may be used to electrify fences.

If used, barbed-wire fences will be constructed using steel posts and four strands of barbed-wire with intermediate wire stays. Gates and/or cattle-guards will be installed as needed. Gates will be chained and locked in cooperation with landowners and/or livestock ranchers. Removable fences, snow fences, and temporary modifications to pasture fences will be constructed as needed to accomplish habitat management objectives. Fence stiles may also be built to facilitate access where appropriate.

Bids for new boundary and pasture fence construction should be solicited through area newspapers, conservation district offices, and other public locations. This should encourage local community involvement as well as reduce initial construction time schedules. Bids must be obtained in accordance with WDW/BPA bidding procedures.

WDW personnel/landowners will delineate pasture fence locations and ensure that all fences are built in accordance with technical specifications and management plan objectives. The locations of boundary fences may require the use of certified surveyors, either currently employed by the WDW, BPA, or obtained on a contract basis. Boundary fence posts may be painted a specific color in order to make identification of project lands easily distinguishable from adjacent privately-owned property, or signs may be posted to identify project lands.

Annual fence maintenance will be the responsibility of WDW wildlife managers and/or landowners. Fence maintenance materials will be purchased by WDW personnel with Operations and Maintenance (O&M) funds supplied by the BPA.

2. Water developments such as dug-outs, water holes, catchments, springs, and wells will be constructed as required to accomplish management objectives.
3. Dug-outs and water holes will be fenced and water piped to a trough for livestock consumption. Wildlife water guzzlers may also be installed and fenced.
4. Springs will be developed or redeveloped using a buried collection system consisting of drain tile or perforated pipe and a collection box. The spring area and overflow will be fenced to exclude livestock. Water will be piped to a trough as required for wildlife and/or livestock use. In addition, ramps, rocks, or floatboards will be provided in all troughs for small birds and mammals to gain access to and escape from water. Additional fencing will be used to encourage and protect new riparian vegetation resulting from spring overflows.

Wherever possible, water pipelines and new power lines will be buried. Well locations will be selected based on geologic reports and local experts. All applicable federal, state, and county laws and regulations will be observed.

5. Existing water resources and associated riparian areas will be fenced and otherwise protected in concert with site specific management plans. Consideration will be given to livestock water and shade requirements.
6. Vegetation manipulation practices such as brush control or enhancement, range seedings, and shrub and tree plantings will be conducted to achieve site specific wildlife habitat mitigation objectives.
7. Existing agricultural fields included in perpetual conservation easements or purchased under Alternative 2 will be converted to and maintained as shrub-steppe grasslands for perpetuity unless WDW wildlife managers determine that other cover types are more conducive to meeting wildlife management objectives.

Cost-sharing opportunities, such as the CRP, will be used whenever possible to offset the cost of converting agricultural fields to shrub-steppe grasslands.

Landowners and/or WDW wildlife managers will establish and maintain shrub-steppe grasslands. Habitat development and maintenance responsibilities will be specified within individual perpetual conservation easements or purchase agreements.

Fields that are currently enrolled in the CRP will be maintained as grasslands for perpetuity unless wildlife management objectives can be better served by replacing the established vegetation with other suitable habitat. Landowners/WDW wildlife managers will follow all CRP regulations, restrictions, and guidelines.

- a. Brush control and enhancement measures designed to improve wildlife habitat conditions may be employed to accomplish habitat management objectives. Brush control methods include burning, chaining, plowing, grazing, and chemical treatments. Brush enhancements may include scarification, planting, and fertilization.

Burning will temporarily reduce big sagebrush abundance because it does not resprout following fire (Pellant, 1989). The impacts of burning on perennial bunchgrass varies with the intensity of the fire, season of the burn, and the effected grass species. The amount of cheatgrass will increase on burned areas. Other perennial grass species may increase in productivity because of the fertilizer effect of fire and reduced shrub competition, but may not increase in abundance (number of plants) because of competition from cheatgrass relative to slow establishing perennial seedlings (Perry, 1991). Studies in Idaho indicate that fall burning does not harm most perennial herbaceous species depending on fire intensity and the amount of litter accumulated on the ground and under individual plants.

Chaining consists of dragging a large chain (ship anchor chain), each end of which is attached to a track-type tractor, through the brush. This inexpensive method is effective only on large brush and small trees with rigid trunks. Chaining will reduce the density of sagebrush and will encourage the growth of bitterbrush seedlings on disturbed bitterbrush sites. New bitterbrush plants may also develop from lower branches that remain attached to root crowns after the tops are removed. The disturbance of the soil and removal of some competition favors the establishment of a new stand of brush from seed as well as encourages the growth of grass, forbs, and legumes (Box, Smith, Stoddart, 1975). Range seedings should follow chaining to minimize the invasion of noxious weeds such as knapweed, skeleton wood, spurge, toadflax, cheatgrass, and others.

As with other treatment methods, proper timing is important. Sprouting shrubs are more affected by mechanical control at low stages in their food storage cycles and when conditions for regrowth are least favorable. Smaller shrubs are more susceptible to mechanical control

methods that crush and pulverize the stems when they are most brittle in late fall or early winter. Reinvasion may be increased if treatment is accomplished after seed formation.

Seedings, if required, will be accomplished with a rangeland drill through broadcast seeding, aerial seeding, or by hand-planting individual plants.

Preparations for seedings will vary and range from brush and cheatgrass control through controlled burns, herbicide applications, or mechanical treatments to no preparation. Seeding establishment and composition, following any treatment, will depend on the success of pre-seeding preparations, seed mix composition, post germination survival, reinvasion of native and introduced plant species, and the amount of precipitation in the year following seeding.

Seed mixes will consist of native and other acceptable grasses, forbs, and legumes as described in site specific management plans. scs planting date recommendations and technical guidelines should be followed.

Seedings may be accomplished by WDW wildlife managers or through sharecrop agreements/contracts with local farmers. Project managers will coordinate with SCS/ASCS representatives to determine if federal cost-sharing programs such as the CRP are available to help defray part of the seeding and maintenance costs.

Shrub and tree plantings will be established to provide forage, browse, and permanent cover for wildlife. They will be planted with mechanical planters and/or by hand. Vegetative competition will be controlled prior to planting and, if required, for a minimum of three years thereafter. Competitive vegetation and noxious weeds will be controlled by mechanical/chemical means. All federal, state, and county regulations and laws will be followed during the application of herbicides.

Shrub and tree plantings will be fenced to exclude livestock. Seedlings will be irrigated with drip irrigation systems or hand watered to increase plant survival, vigor, and growth. Irrigation will continue for a minimum of two years or until shrubs and trees are able to survive without supplemental water.

Native shrub and tree species such as catkin-producing water birch (*Betula occidentalis*), serviceberry (*Amelanchier alnifolia*) hawthorne (*Crataegus douglasii*) chokecherry (*Prunus Virginian?*), and others will be planted to enhance sharp-tailed grouse habitat.

WDW wildlife managers will be responsible for planning, coordinating, and conducting planting activities.

The survival of shrubs and trees will vary depending on planting methodology, species adaptability, soil parameters, control of vegetative competition, precipitation, and wildlife/livestock depredation.

9. Information and regulatory signs will be posted to control public access, delineate project boundaries, and provide additional information/guidance as required.
10. Observation blind(s) and/or public viewing stations may be constructed at selected sharp-tailed grouse lek sites to allow public viewing of spring courtship mating displays. Blinds will be located and constructed in such a manner as to minimize disturbance at the leks. Parking areas will be built out-of-sight of the lek(s). Similar structures may also be constructed at sage grouse leks.

Access to the observation blinds will be regulated by WDW personnel by scheduling group tours or through other controlled means.

WEED CONTROL

Weed control will be accomplished as required by state and county regulations through biological, mechanical, and/or chemical control measures. Federal, state, and county regulations governing the use of pesticides will be observed.

WDW wildlife managers will annually conduct surveys and coordinate with landowners to detect and control new invasions of noxious weeds.

WDW managers and/or landowners will identify, inventory, and map existing noxious weeds on project lands and develop a control plan for each weed species. The plan will include the following:

1. Status of the weed as defined by State/County Noxious Weed Control Boards/Laws.
2. A map showing current weed locations as a reference to planning control work and to monitor its spread or reduction in coverage with treatment.
3. Identification of preferred/alternative control methodologies.
4. Selection of primary control measure(s) that will provide the necessary level of weed control and still meet wildlife/habitat management objectives.
5. Time table for initial and follow-up treatments.
6. Identification of management practices/treatments required to minimize establishment, reinvasion, and dispersion of noxious weeds.
7. Implementation of control strategy.
8. Plan to monitor the effects of the treatment(s) on targeted weed species, habitat, and wildlife.
9. Strategy to coordinate noxious weed control measures with adjacent landowners.

Constant plant community monitoring should be emphasized and, whenever possible, weed control measures should be initiated while the infestation is small. If a noxious weed is established over a wide area, control measures will be done to meet community standards. More extensive control practices may be applied under the following conditions:

1. Control measures will not negatively impact wildlife/habitat
2. Control measures will significantly enhance wildlife habitat/populations.

Alternative weed control practices will be evaluated and selected based upon the following considerations:

1. Costs/benefits
2. Location of weed concentration
3. Difficulty of control
4. Treatment effectiveness/level of control required
5. Labor and equipment constraints
6. Availability of biological control options
7. Timing of treatments.

WDW Management Standards and Guidelines include the following prioritized weed control measures:

1. Biological control
 - Insects/diseases
 - Acceptable/desirable competing vegetation
2. Mechanical control
 - Hand pulling
 - Mowing or cultivation
 - Grazing
3. Herbicide Control - Herbicide selection will be based upon the following criteria:
 - Herbicide use limitations (registered uses)
 - Selection of chemical(s) of lowest toxicity that is effective on target weed species and minimizes the need for reapplications
 - Application/chemical costs

Herbicides will be applied in such a manner as to avoid spray drift and contact with non-target plant species. Whenever possible, annual herbicide applications will be limited to sites with high seed dispersal potential such as road sides, access areas, parking areas, etc. This does not preclude the application of herbicides to rangelands and cultivated fields on an as-needed basis.

All herbicide label directions and safety precautions will be followed. The lowest chemical concentration feasible to accomplish weed control objectives will be used. Furthermore, WDW wildlife managers, in conjunction with landowners, should review and modify management to minimize reinvasion of noxious weeds.

Once weed infestations have been controlled, WDW wildlife managers and landowners should consider planting competing vegetation. Habitat/range management manipulation practices should be applied during the control phase to discourage the reinvasion of weed species (maximize desirable plant competition, minimize the condition that allowed weed establishment).

Weed control measures will be monitored and adjusted as required to accomplish wildlife management objectives.

Weed control measures will be monitored and adjusted as required to obtain specific management objectives.

FIRE CONTROL

Wildfires on lands managed by the WDW will be suppressed. Responsibility for wildfire protection and suppression rests primarily with local fire protection districts and/or the DNR.

Fire protection on project lands will be included as part of annual O&M costs. WDW currently uses the following system for land it manages:

1. Lands within the boundaries of a fire protection district: An assessment of the cost of suppression efforts is paid.
2. Lands outside of, but adjacent to, the boundaries of a fire protection district: The costs of fire suppression are paid to adjacent fire district.
3. Unprotected lands: Contract with the DNR and/or county fire districts, or use WDW personnel to control the fire (Beckstead, 1991).

WDW wildlife managers will eliminate fire hazards on project lands whenever possible. In the event of a wildfire, WDW personnel will notify the appropriate fire control agency, advise adjoining landowners and recreational users, and if directed, assist with suppression efforts as needed.

The WDW may eliminate all public access to project lands during periods of high fire danger. Lands will be posted and patrolled whenever a closure is implemented.

The control of wildfires does not preclude the use of prescribed burns for habitat manipulation purposes; however, WDW personnel must have the appropriate training and proper equipment to use fire as a management tool. In addition, prescribed burns should be planned and completed with the assistance of WDW and SCS range/forestry specialists. All applicable permits will be obtained and state/local regulations complied with.

RECREATION MANAGEMENT

Public recreation opportunities are important, but subordinate to wildlife/habitat management goals and objectives. The biological and habitat requirements of the sharp-tailed grouse, threatened and endangered species, and other species of concern must take precedence over recreation programs on project lands.

Recreation management programs will be developed and monitored by the WDW on all mitigation lands whether purchased through fee title or managed with perpetual conservation easements.

WDW wildlife managers will determine the type and scope of access programs and recreational opportunities that will be allowed on specific sites. Activities must not conflict with wildlife goals and objectives and be consistent with WDW mandates.

All public access and recreational opportunities will be regulated throughout the year by WDW wildlife managers to protect sensitive habitats and minimize disturbance to wildlife species.

Landowner/WDW liability will be in accordance with RCWs 4.24.200 and 4.24.210 (Appendix F) which "encourage owners of land to make land and water available to the public by limiting their liability for persons who enter that land and may be injured or otherwise damaged by acts or omissions of others."

MANAGEMENT OF SENSITIVE WILDLIFE

Department owned/managed lands will be managed for sharp-tailed grouse as well as threatened and endangered and other species of concern. Opportunities to enhance potential habitat to aid in the recovery of sensitive wildlife species will be a high priority. Where conflicts between the habitat needs of species of concern and any species not so designated occur, habitat will be maintained to support the sensitive species.

WDW nongame biologists will develop monitoring/management plans for sensitive wildlife species occurring on project lands. Management plans will be implemented by project wildlife managers. WDW revenues, if available, as well as other funding sources will be used to complement mitigation habitat enhancement efforts for threatened and endangered wildlife species and other sensitive wildlife species.

WDW wildlife managers will report observations of threatened and endangered and other species of concern occurring on project lands to the WDW nongame data system. Monitoring plans should be developed to ensure that the habitat occupied by a species of concern is regularly examined for occupancy and that habitat maintenance or enhancement activities are effective.

The following table lists the sensitive wildlife species that may occur on proposed project lands.

TABLE 2. SENSITIVE WILDLIFE SPECIES THAT MAY OCCUR ON OR FREQUENT THE PROPOSED PROJECT AREA

<u>Common Name</u>	<u>Scientific Name</u>
Birds	
Sharp-tailed grouse	<u>Tympanuchus phasianellus</u>
Sage grouse	<u>Centrocercus urophasianus</u>
Sage sparrow	<u>Amphispiza belli</u>
Sage thrasher	<u>Oreoscoptes montanus</u>
Ash-throated fly catcher	<u>Myiarchus cinerascens</u>
Grasshopper sparrow	<u>Ammodramus savannarum</u>
Brewer's sparrow	<u>Spizella breweri</u>
Lark sparrow	<u>Chondestes grammacus</u>
Burrowing owl	<u>Athene cunicularia</u>
Snowy owl	<u>Nyctea scandiaca</u>
Ferruginous hawk	<u>Buteo regalis</u>
Swainson's hawk	<u>Buteo swainsoni</u>
Prairie falcon *	<u>Falco mexicanus</u>
Gyr Falcon	<u>Falco rusticolus</u>
Golden eagle	<u>Aquila chrysaetos</u>
Bald eagle *	<u>Haliaeetus leucocephalus</u>
Mammals	
Pygmy rabbit	<u>Brachylagus idahoensis</u>
White-tailed jackrabbit	<u>Lepus townsendi</u>
Sagebrush vole	<u>Lagurus curtatus</u>
Amphibians	
Long-toed salamander	<u>Ambystoma macrodactylum</u>
Tiger salamander	<u>Ambystoma tigrinum</u>
Horned lizard	<u>Phrynosoma douglassi</u>
Sagebrush lizard	<u>Sceloporus graciosus</u>
Spotted frog	<u>Rana pretiosa</u>

* Federal threatened and endangered species.

Source : Hickman, WDW, 1991

The following wildlife and plant Candidate species may occur in the vicinity of the project (Table 3).

TABLE 3. FEDERAL CANDIDATE ENDANGERED AND THREATENED
WILDLIFE AND PLANT SPECIES

(There are no federally Listed or Proposed endangered and threatened species.)

<u>Common Name</u>	<u>Scientific Name</u>
California wolverine	<u>Gulo gulo luteus</u>
Columbian sharp-tailed grouse	<u>Tympanuchus phasianellus</u>
Long-billed curlew	<u>Numenius americanus</u>
western sage grouse	<u>Centrocercus urophasianus</u>
Washington polemonium	<u>Polemonium pentinatum</u>

source: USFWS, 1991

MANAGEMENT OF CULTURAL, GEOLOGICAL, AND BOTANICAL FEATURES

Cultural sites on WDW owned or controlled lands will be protected. It is unlawful to alter any historic or prehistoric site or to remove artifacts from state owned/controlled property. The BPA will identify paleontological, archeological, and historical resources and Native American sites through the National Environmental Protection Assessment (NEPA) process.

The location(s) of all sites will be reported to the Department of Community Development (DCD). The DCD will be consulted prior to initiation of activities that may impact a known site. If a site is inadvertently disturbed, all activity shall stop and the DCD shall refer to the appropriate authority responsible for supervising site restoration.

Geological and sensitive botanical sites will also be protected. Management activities occurring near these sites will not be done so they threaten the integrity of the feature. WDW managers/specialists shall coordinate with DNR Natural Heritage Program staff before implementing activities near or on a sensitive botanical site.

All special features of interest should be periodically monitored to ensure that the resource is maintained in its present condition. Likewise, a plan should be developed to restore damaged or destroyed features of special interest.

MONITORING

Habitat

A resource monitoring plan should provide wildlife managers with enough information to make sound decisions regarding the implementation and adjustment of management activities.

The effects of implementing habitat management strategies will be evaluated and monitored for the life of the project. WDW wildlife managers will develop a monitoring and evaluation program to accomplish the following:

1. To determine if an-activity is fulfilling the purpose and need for which it was designed, or if there is a need for modification or termination of current management.
2. To identify unanticipated and/or unpredicted impacts, positive or negative.
3. To ensure that decisions are being implemented as scheduled.
4. To provide consistency with federal, state, and local plans, programs, and regulations.
5. To monitor mitigation program benefits (environmental, social, biological, economic), as well as cost.
6. To evaluate the impacts of grazing on plant communities in order to form a basis for modifying pasture rotations, seasons of use, grazing intensities, or possible elimination of this management practice.
7. To ensure that terms and conditions of conservation easements are implemented and complied with by all parties.

Base line information concerning range conditions and wildlife populations may be available through SCS/landowner farm plans, WDW personnel, and the USFWS; however, additional sampling may be required to document present conditions. WDW range specialists, SCS range conservationists, and landowners should be consulted to facilitate the collection of base line data.

Monitoring techniques should be consistent with methodologies used in studies conducted in Idaho and other states/provinces.

Information obtained through monitoring will be used to evaluate wildlife habitat conditions, AUM allotments, pasture grazing rotations, forage use patterns, and to detect changes in plant communities. Table 4 lists examples of methodologies that may be used to monitor vegetative trends, forage utilization, plant parameters, and other environmental variables.

TABLE 4. HABITAT VARIABLE MEASURING TECHNIQUES

<u>Habitat Variable</u>	<u>Measuring Technique</u>
1. Canopy Cover (grass/forbs)	Micro Plot
2. Canopy Cover (shrubs/small trees)	Line Intercept
3. Canopy Cover (trees/brush piles)	Spherical Densiometer
4. Canopy Diameter	Diameter Tape
5. Horizontal Foliar Density	Vegetation Profile Board
6. Vertical Vegetation Cover	Cover Pole
7. Height of Plants	Graduated Rod Optical Range Finder
8. Plant Density	Calculated Cover
9. Frequency of Herbs/Shrubs/Trees	Quadrat
10. Plant Diversity	Calculated Community Dominance
11. Slope and Aspect	Clinometer and Compass Topo Maps
12. Water Depth	Graduated Rod
13. Water Velocity	Averaging

Source : Hays, 1991.

The methodology and monitoring intensity that is chosen for a site will be determined by the nature and severity of the resource conflicts that are present at that site. The Geographical Information System (GIS) can also be used to determine habitat variables/measurements.

Wildlife

Wildlife monitoring efforts within the project area will focus on indicator species; threatened, endangered, and sensitive wildlife species; and related biotic resources using both temporary and permanent study techniques.

Lek surveys, brood routes, flushing counts, and line transects are a few of the techniques that can be used, in conjunction with habitat variable measuring methodologies, to monitor wildlife responses to habitat conditions and trends;

browse/forage availability, utilization, composition, and vigor; changes in cover and habitat effectiveness; and general habitat conditions.

A "presence/absence" survey will be utilized to document nongame response to habitat management.

An effective monitoring process should detect qualitative and quantitative changes in habitat and/or wildlife populations. Information obtained through the monitoring and evaluation process should be analyzed and fed back into the management plan review process in order to evaluate the impacts of land use decisions as well as the adequacy of mitigation measures.

ADDITIONAL ISSUES

Property Taxes

The use of perpetual conservation easements will be explored prior to pursuing fee title acquisitions. Landowners will be responsible for property taxes under Alternative 1, Perpetual Conservation Easements. Conversely, property taxes under Alternative 2, Fee Title Acquisitions, may be paid by the WDW and/or the BPA with annual O&M funds. In addition, BPA may explore with effected counties alternative forms of compensation other than property taxes.

Exotic Wildlife

Exotic wildlife introductions will not be allowed on mitigation lands. This is necessary to protect as well as encourage the recovery and maintenance of native wildlife species.

Exotic wildlife includes pheasants, gray partridge, quail, turkey, game farm reared upland birds along with any other non-native wildlife species.

Off-Road Vehicles

Off-road vehicles (ORVs) will not be operated on project lands except by WDW personnel/landowners as required to complete habitat management/monitoring activities. Privately-owned vehicles will be restricted to county roads and designated parking areas in order to reduce the spread of noxious weeds, protect fragile habitats and agricultural fields, and to reduce disturbance to wildlife populations.

Tribal Needs

Tribal subsistence and ceremonial needs will be addressed in accordance with current federal treaty provisions and state/county regulations.

Crop Depredation

Landowners adjacent to the project area may suffer crop damage due to increased wildlife populations. Hunting will be used to eliminate crop depredation whenever possible; however, if crop damage still occurs, landowner damage claims and specific problem situations will be dealt with in the following manner.

Response to Damage Complaints: Following a report of damage, a WDW representative will contact the landowner and/or respond to the complaint within 48 hours.

Disbursing/Elimination: The WDW will provide landowners with propane guns, firecrackers, cracker shells, and shotgun shells for disbursing and redistributing depredating wildlife.

When no other practical means of damage control is feasible, selected big game animals may be killed out of season. An assessment will be made by WDW field personnel to determine the effectiveness of remedial methods. Consideration will be given to such factors as time of year, extent of damage, potential for future damage, and whether season adjustments are necessary.

The number of big game animals eliminated will be the minimum necessary to help landowners disperse them from a crop that is being damaged.

The preferred method of out-of-season elimination is to permit licensed hunters the opportunity to harvest the animals. The presence of hunters associated with the killing of a minimum number of animals has proven to be an effective means of disbursement.

Hot spot damage control hunts may be considered when the value of the potential claim exceeds \$1,000. Authority for the hot spot hunt rests with the WDW regional manager. Hunters will be randomly selected by computer.

If hot spot damage control is not effective or cannot be used, WDW regional managers may authorize kill permits.

Trapping and/or relocating nuisance wildlife may be considered if other control methods are ineffective or inappropriate.

Compensation: Landowners suffering crop damage may choose to receive hay as replacement for lost crops. The advantages to the landowner are: almost immediate settlement, no requirement to file a formal damage claim, and quality (alfalfa) hay available at their convenience. This method of compensation would apply in the following situation and manner:

- Landowner and local WDW representative agree on a dollar value of damage.
- Cost of replacement hay will not exceed \$2,000 based on average local price at time of agreement. Both parties agree that the exchange, hay for damages, is full and final payment.

Formal Damage Claims: Where damage does not exceed \$500, and the landowner and the WDW representative agree on the amount of loss, settlement will be at the local level.

Claims in excess of \$500 and less than \$2,000 will be processed and the claimant notified of the disposition within 60 days of receipt of the claim in Olympia. However, if a crop value cannot be established within 60 days, the claimant will be advised and the claim will be processed as soon as possible. Nothing will prohibit the claimant and the WDW from agreeing on a reasonable extension.

Claims that are denied by the WDW director, or payment amount refused by the claimant, must go to the legislature for consideration.

Landowner Cooperation: Landowners will allow/encourage hunting on their property. Whenever practical landowners will assist in preventing damage by allowing public hunting during scheduled hunting seasons.

Predator Control

Predatory birds and mammals may be controlled on project lands and adjacent areas in order to protect declining native prairie grouse populations. Predator control may also be warranted in conjunction with wildlife reintroductions and instances of livestock depredation.

Studies conducted in Idaho suggest that sharp-tailed grouse nest predation declines with distance from the lek and that ravens and magpies were suspected of being responsible for most nest losses (Apa, 1991).

As a result, ravens and magpie populations may be controlled within the project boundaries and adjacent lands. In addition, predators such as coyotes, badgers, and skunks will be controlled, as required.

Control measures will be accomplished by WDW wildlife managers in accordance with federal, state, and county regulations. At the discretion of the WDW, other individuals may be authorized to conduct predator control activities on project lands.

Control measures will not exceed that which is necessary to obtain a minimum level of control over offending predators.

WDW wildlife managers should advise landowners and consult with the USFWS, local county extension agents, and the Department of Agriculture prior to initiating predator control activities.

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APPENDIX A

NORTHWEST POWER PLANNING COUNCIL WILDLIFE MITIGATION STANDARDS

All mitigation projects will be evaluated on how well they:

1. Complement the activities of the region's state and federal wildlife agencies and Indian tribes;
2. Be the least costly way to achieve the biological objective;
3. Protect or enhance special habitat or species that would not be available unless prompt action is taken; such proposals should only be implemented with the consent of the Council;
4. Encourage the formation of partnerships with other persons or entities, which would reduce project costs, increase benefits and/or eliminate duplicative activities;
5. Have measurable objectives such as the restoration of a given number of habitat units;
6. Not impose on the BPA the funding responsibilities of others, as prohibited by section 4(h)(10)(A) of the Northwest Power Act;
7. Address special wildlife losses in area that formerly had salmon and steelhead runs that were eliminated by hydroelectric projects (for example, societal and tribal wildlife losses);
8. Protect high quality, native, or other habitat or species of special concern, whether at the project site or not, including endangered, threatened, or sensitive species;
9. Provide riparian or other habitat that may benefit both fish and wildlife;
10. Address concerns over additions to public land ownership and impacts on local communities, such as reduction or loss of local government tax base, special district tax base; or the local economic base, or consistency with local governments' comprehensive plans;
11. Use publicly-owned land for mitigation, or management agreements on private land, in preference to acquisition of private land, while providing permanent protection or enhancement of wildlife habitat in the most cost-effective manner;

- .
12. Mitigate losses in-place, in-kind, where practical. When a wildlife measure is not directly related to hydroelectric caused loss, the habitat units protected, mitigated, or enhanced by that measure will be credited against mitigation due for one or more hydroelectric projects, including power-related storage or regulatory dams;
 13. Help protect or enhance natural ecosystems and species diversity over the long term; and
 14. Use the best available scientific knowledge.

APPENDIX B

GRAND COULEE/CHIEF JOSEPH WILDLIFE MITIGATION STEERING COMMITTEE

The Steering Committee was established to represent local input and concerns with the planning and implementation process.

Local Utilities	Ralph Byre
Wheat Growers (Lincoln County).....	Hal Johnson
(Douglas County).....	Lee Hemmer
Cattlemen (Lincoln County).....	Keith Nelson
(Douglas County).....	Allan Miller
Colville Confederated Tribes;	Steve Judd
Upper Columbia United Tribes	Chris Merker
Conservation Groups (Ephrata Sportsmen's Club)..	Don Galbreath
Sportsman/Landowner	David Stevens
Environmental Groups (WA Environmental Council)..	Larry Hampson
Local Government (Stevens County)	Allan Mack
(Stevens County)	Tom McKern
(Douglas County)	Jay Weber

APPENDIX C

UNPUBLISHED HABITAT EVALUATION PROCEDURE (HEP) MODELS

The following materials are unpublished habitat evaluation models used to determine the habitat suitability indices for the Grand Coulee Dam Wildlife Mitigation study.

1. Sharp-Tailed Grouse (Tympanuchus phasianellus) from Ashley, et al., 1990.
2. Sage Grouse (Centrocercus urophasianus) from Ashley, et al., 1990.
3. Mule Deer (Odocoileus hemionus) from Ashley, et al., 1990.
4. Pygmy Rabbit (Sylvilagus idahoensis) from Ashley, et al., 1990.

SHARP-TAILED GROUSE
(*Tympanuchus phasianellus*)

CHARACTERISTICS

The sharp-tailed grouse are of moderate size (17 inches) and color, with scaled and spotted underparts, a tail that is mostly white and pointed, and yellowish eye combs.

FOOD AND HABITAT REQUIREMENTS

Sharp-tailed grouse feed primarily on plant materials, although insects also consumed in spring and summer. Grasses and flowers are important foods in spring and summer. Optimum habitat is 10-25% herbaceous cover. Winter foods consist of buds, twigs and catkins from shrubs and trees. Optimum winter habitat includes greater than 25% bud producing status and trees.

Remnant native habitats containing a mixture of native grasses and brush are most likely to support sharp-tailed grouse. Optimum habitats are composed of a combination of grass, shrub and shrub/grass communities rather than pure stands of any of these community types. Edges between shrubby and grassy cover types are especially important to this species.

Bunchgrass clumps and woody vegetation are used by sharp-tails for cover from weather and predators and for visual isolation of individuals during feeding, resting and nesting activities. Winter roosts are established in snow burrows when snow is deep; however, woody vegetation is used when snow is shallow or crusted. Riparian areas, conifer forest edges and woody ravines also provide important cover for grouse throughout the year.

BREEDING

The breeding season begins in early April with young dispersed by mid-July. Male birds gather at display grounds, or "leks," following receding snow cover when fall-grown forb and grass foods become available. The male's purpleneck sacs are inflated during courtship display as he rattles his wing quills to attract females while performing a ritualized courtship dance. Individual birds return to traditional leks and defend the same territories used in previous years. Territory sizes may range from 46-558 square feet. With typically 8-12 males present at a lek site.

Sharp-tailed grouse leks are likely to occur in areas of low or sparsely distributed mixed vegetation. Washington leks are established on barren areas with little or no vegetation within native bunch grass prairies. Nests are built on the ground and may be located beneath a clump of bunchgrass and within 10 feet of brushy cover.

STATUS IN WASHINGTON

In Washington, sharp-tailed grouse live along the edges of native bunchgrass prairies of eastern Washington. The bird was extirpated from portions of its former range, which included California, Oregon and Nevada. The major limiting factor for sharp-tailed grouse is the availability of undisturbed native grass and shrub communities.

Sharp-Tailed Grouse
(*Tympanuchus phasianellus columbianus*)
Shrub-Steppe (SS)

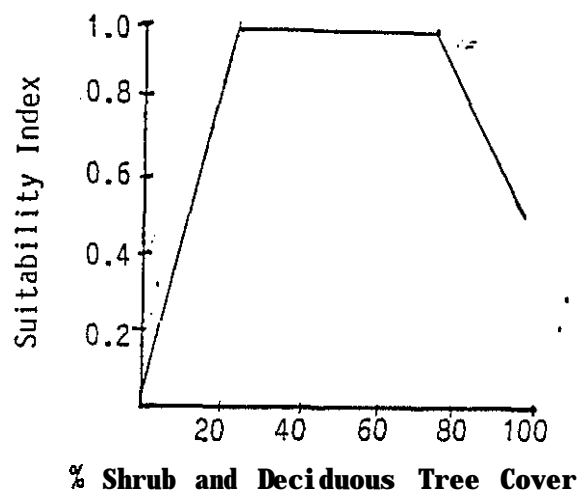
Draft 10/90

Winter Range

Variable 1: % Shrub and Deciduous Tree Crown Cover

V1 Field values:

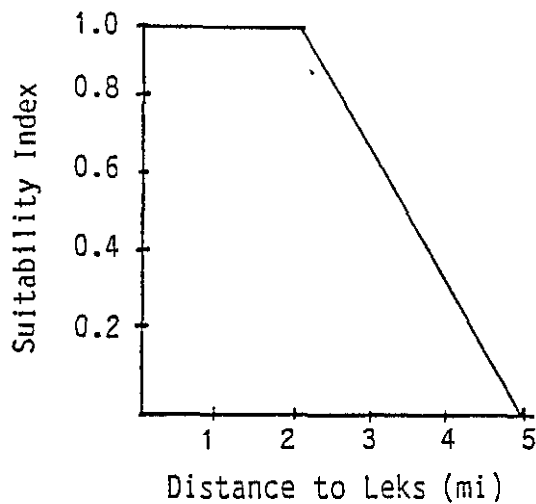
1 - 25% = 0.5
 25 - 75% = 1.0
 75 - 100% = 0.7
 0% = 0



Variable 2: Distance to Leks (mi)

V2 Field values:

0
 2.1 - 3mi = 1.0
 3.1 - 4mi = 0.5
 4.1 - 5mi = 0.2
 > 5mi = 0



Sharp-Tailed Grouse
(*Tympanuchus phasianellus columbianus*)
Shrub-Steppe (SS)

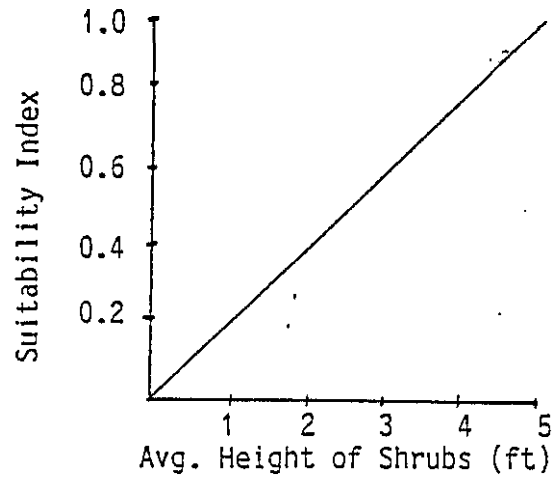
Draft 10/90

Winter Range

Variable 3: Avg Height of Shrubs (ft)

V3 Field values:

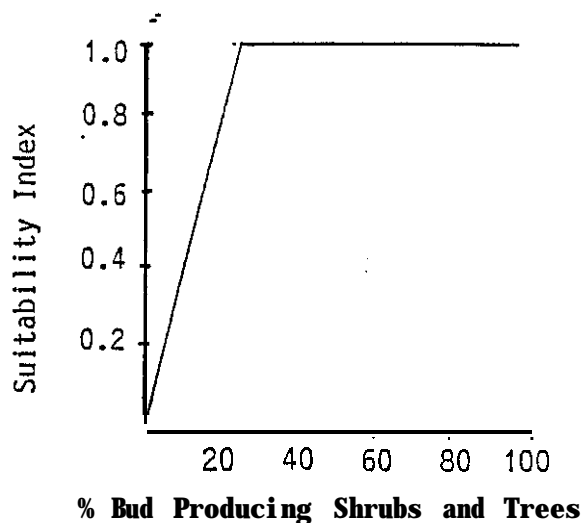
0 - 1 = 0
1.1 - 2 = 0.3
2.1 - 3 = 0.5
3.1 - 4 = 0.7
4.1 - 5 = 0.9
> 5 = 1.0



Variable 4: % Bud Producing Shrubs and Trees

V4 Field values:

0 - 5 = 0
6 - 15 = 0.2
16 - 25 = 0.7
> 25 = 1.0



$$HSI = \frac{(V1 \times V2 \times V3)^{1/2} + V4}{2}$$

Summer Range

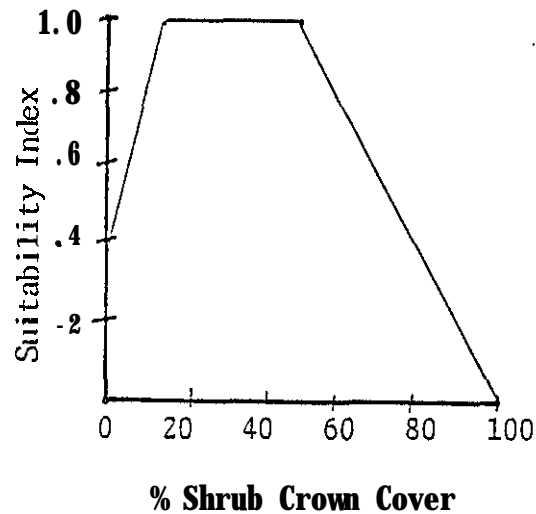
Sharp-Tailed Grouse
(*Tympanuchus phasianellus columbianus*)
Shrub-Steppe (SS)

Draft 10-90

Variable 1: % Shrub Crown Cover

V1 Field values:

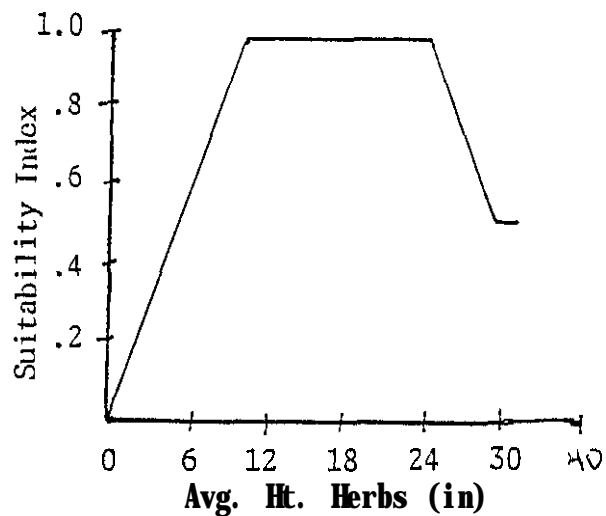
0 - 10 = 0.7
11 - 50 = 1.0
51 - 75 = 0.5
76 - 100 = 0.2



Variable 2: Average Height of Herbaceous Vegetation (in)

V2 Field values:

0 - 10.9 = 0.5
11 - 24.9 = 1.0
25 - 40 = 0.7



Sharp-Tailed Grouse
(*Tympanuchus phasianellus columbianus*)
Shrub-Steppe (SS)

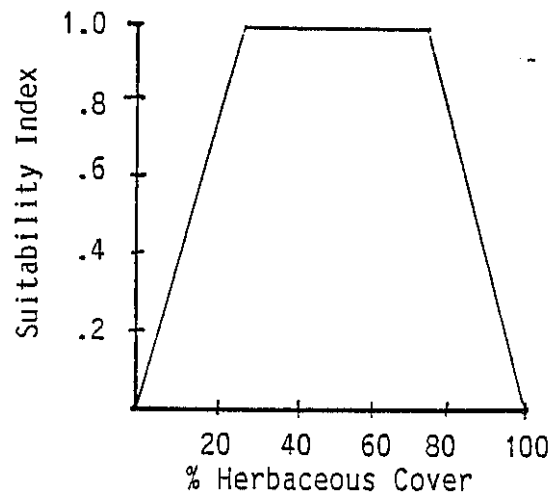
Draft 10/90

Summer Range

Variable 3: % Herbaceous Cover

V3 Field values:

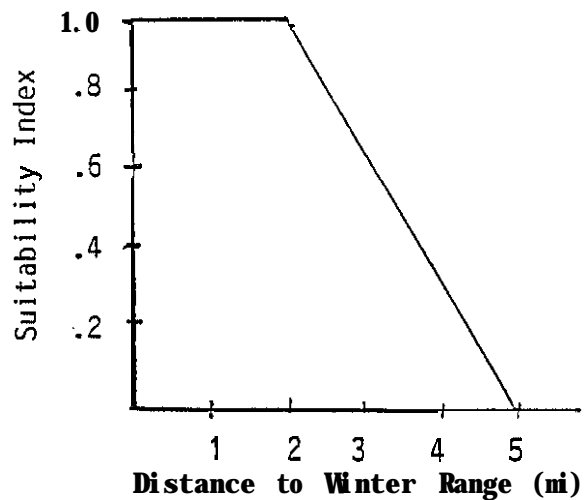
0 - 25 = 0.5
 26 - 75 = 1.0
 76 - 100 = 0.5



Variable 4: Distance to Winter Range (mi)

V4 Field values:

0 - 2 = 1.0
 2.1 - 3 = 0.8
 3.1 - 4 = 0.5
 4.1 - 5 = 0.2



$$\text{HSI} = (\text{V1} + \text{V2} + \text{V3} + \text{V4}) / 4$$

SAGE GROUSE
(centrocercus urophasianus)

CHARACTERISTICS

Sage grouse are very distinctive with a black belly, long pointed tail feathers and large size (28 inches in length). Excluding the recently introduced turkey, it is Washington's largest upland game bird, the males attaining a weight of over six pounds. The male is larger and more colorful than the female, with yellow eye combs, black throat and bib, and a large white ruff on its breast. In flight, the dark belly, absence of white outer tail feathers and its much larger size distinguish this bird from the sharp-tailed grouse.

FOOD AND HABITAT REQUIREMENTS

The sage grouse has a specialized digestive system. It possesses a thin-walled stomach adapted to a soft vegetable diet. All other gallinaceous game birds have thick-walled gizzards designed for grinding hard seeds. For this reason the sage grouse is inseparably linked with the sage brush plant for food. About 75% of the diet consists of sagebrush leaves. A minimum of 20% sagebrush cover is optimum. Forbs and insects are also important to the bird's nutritional requirements. Animal foods comprise up to 10% of the diet.

Typical sage grouse habitat consists of lightly-grazed areas of big sagebrush interspersed with grasses and forbs. Wet meadows and wheat fields adjoining such areas are extensively used.

Water is used daily when it is available, although sage grouse can go for long periods without drinking. The best populations are usually found near water.

BREEDING

The sage grouse is promiscuous in its mating habits. Beginning in early spring the males travel up to several miles to a central, open "strutting ground;" where each day at dawn and dusk they strut and display before the hens. Courting males fan their tails and rapidly inflate and deflate their air sacs, emitting a loud popping sound. Mating occurs at the strutting ground. These areas, sometimes termed leks, are characterized by bare ground ranging from 0.1 to 100 acres. Leks are usually adjacent to nesting and rearing habitats. The nest is located on the ground, under a sagebrush or in a clump of ryegrass, and usually contains from 7 to 13 eggs. optimum nesting habitat has a minimum of 20% cover of sagebrush ranging from 7-30 inches in height. Sage grouse use the same leks and nesting sites year after year.

STATUS IN WASHINGTON

The sage grouse was formerly abundant wherever big sagebrush was present in eastern Washington. The large bird and its eggs were an important item in the diet of the early settlers of the area. Destruction of its habitat by planing and sagebrush control, cattle grazing, over-shooting and perhaps unknown factors have drastically reduced its numbers, and it is now absent from most of its former range.

Sage Grouse
(Centrocercus urophasianus)

Draft 10/90

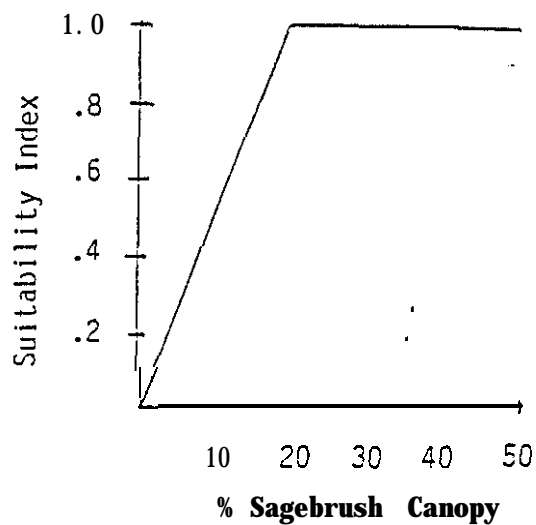
Shrub-Steppe (SS)

Winter Habitat

Variable 1: Percent sagebrush canopy.

V1 Field Values.:

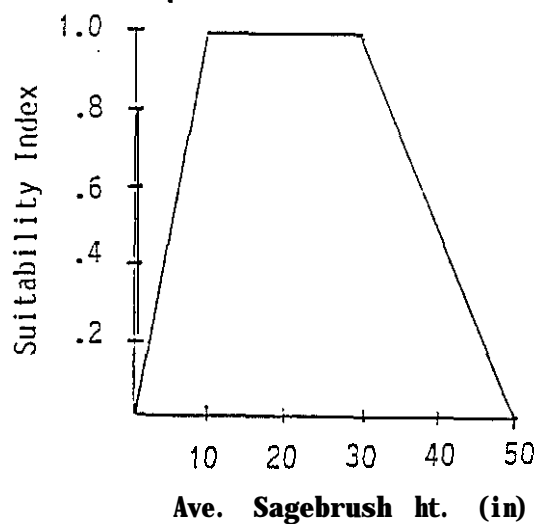
0% = 0
I - 10% = .2
10 - 19% = .7
20 - 50% = 1.0



Variable 2: Average sagebrush height (in)

V2 Field values:

0in = 0
1 - 10in. = .2
10 - 30in. = 1.0
31 - 40in. = .7
41 - 50in. = .3
> 50in = 0



$$\mathbf{HSI} = (V1 \times V2)^{1/2}$$

MULE DEER

CHARACTERISTICS

Mule deer are best distinguished by the small black tipped tail, evenly forked antlers, and large (4 inch) scent gland inside the back leg.

FOOD AND HABITAT REQUIREMENTS

The availability of adequate browse is often the limiting factor for mule deer populations over much of their range (Schneegas and Bumstead 1977). Browse often furnishes 75% or more of the mule deer's winter diet. Forbs and grasses are supplemental winter foods and their availability will result in an increased food value for mule deer. Quantity and quality of nutritious forage in the spring has a major effect on mule deer production and survival (Wallmo et al. 1977).

Thermal cover is provided by woody vegetation over 5 feet tall with a crown cover exceeding 50%. Hiding cover is defined as vegetation greater than 24 inches tall that can hide 90% of a bedded deer at 150 feet or less (Hall 1985). Topographic relief also provides hiding cover value as well as thermal protection from winds (Zender, Ashley, pers comm 1990).

STATUS IN WASHINGTON

Overall deer populations in southeast Washington are not low now. However, if an extended series of droughts or severe winters significantly reduced current numbers, many herds could not rebuild very easily with the existing low buck/doe ratios. A ratio of about 15 bucks for every 100 does is needed for adequate reproduction. However, most southeast Washington mule deer herds have declined to less than 5 bucks per 100 does.

MULE DEER
(*Odocoileus hemionus*)
Shrub-Steppe (SS)

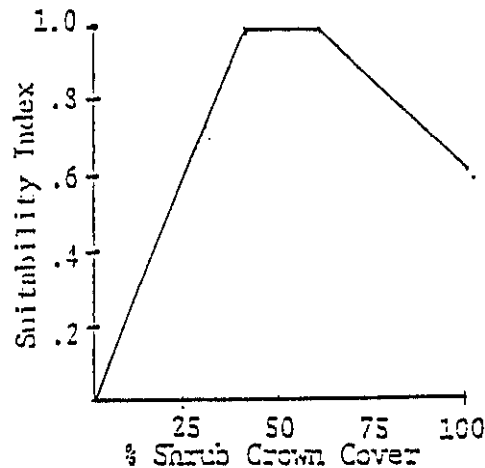
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Winter Habitat

Variable 1: Percent Shrub Crown Cover \leq 5 ft in height
(do not consider small conifers as shrubs)

V1 Field values:

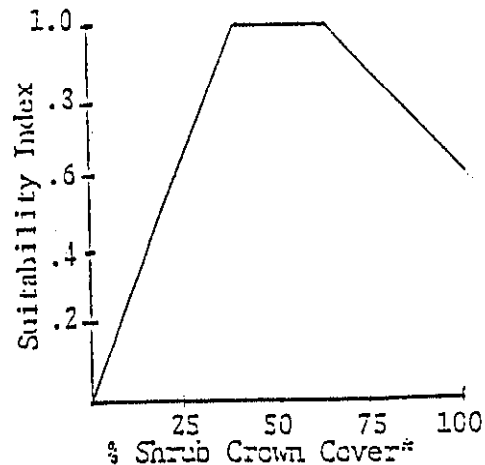
	0%	=	0
	< 25%	=	.2
25	- 40%	=	.7
41	- 60%	=	1.0
61	- 100%	=	.3



Variable 2: Percent Shrub Crown Cover of preferred shrubs \leq 5 ft in height*

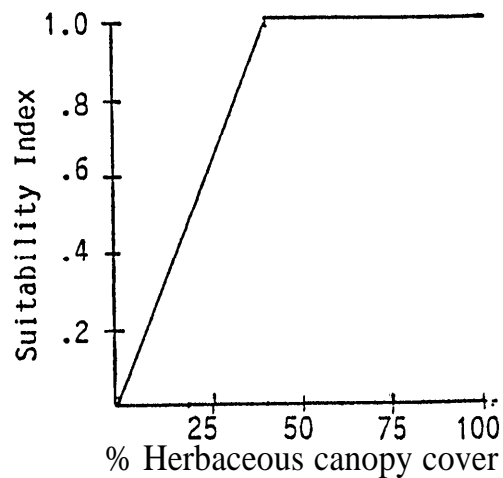
V2 Field values:

	0%	=	0
	< 25%	=	.2
25	- 40%	=	.7
41	- 60%	=	1.0
61	- 100%	=	.3



* Preferred shrubs include, but are not limited to:
bitterbrush, serviceberry, nine bark, chokecherry, rose spp.,
squaw current, willow, water birch, aspen.

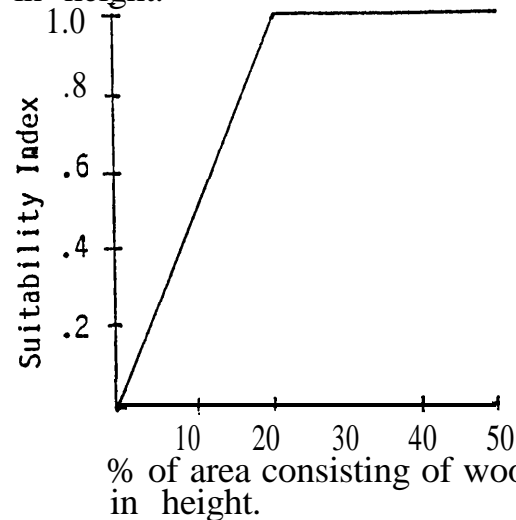
Variable 3: Percent herbaceous. canopy cover.



V3 Field values:

0% = 0
 <25% = .2
 25-40% = .7
 >40% = 1.0

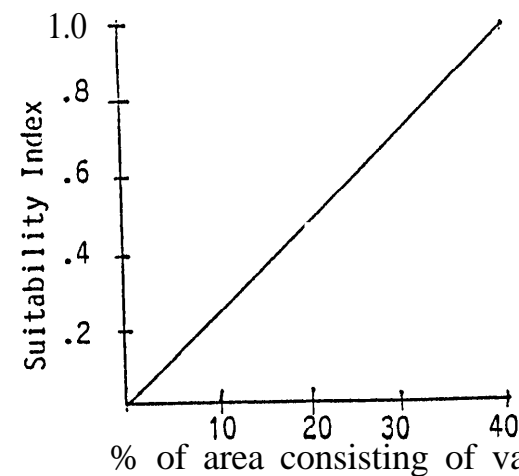
Variable 4: Percent of area consisting of woody evergreen vegetation 1.6 feet in height.



V4 Field values:

0% = 0
 1 - 10% = .2
 11 - 20% = .7
 >20% = 1.0

Variable 5: Percent of area consisting of variable topography.



V5 Field values:

<10% = 0
 10 - 20% = .3
 21 - 30% = .6
 31 - 40% = .8
 >40% = 1.0

$$HSI = \left[\left(\frac{V1+V2+V3}{3} \right) \times \left(\frac{V4+V5}{2} \right) \right]^{1/2}$$

PYGMY RABBIT
(*Sylvilagus idahoensis*)

CHARACTERISTICS

Pygmy rabbits are, as their name implies, very small rabbits, the smallest in North America. They weigh only 1/2 to one pound. These diminutive rabbits are slate-gray on top, buff-colored on the belly, with cinnamon coloring on the legs, chest and nape of neck. Tail and legs are notably small. These rabbits are nocturnal to crepuscular (dawn and dusk) in their activity patterns and unlike cottontails, they do not display a white tail when running.

FOOD AND HABITAT REQUIREMENTS

Pygmy rabbits are found primarily in areas of sage and where the soil is rock-free and soft enough to dig burrows. A three foot depth is optimum. undisturbed areas of big sage (*Artemisia tridentata wyomingensis*) are most important with optimum habitat at a minimum sage density of 20% cover. The rabbits dig their own burrows but will occasionally use abandoned badger burrows. Burrows usually have more than one opening, well-defined runways, and "scrapes" outside the burrow entrance in which the rabbits lay. Because they are a relatively slow moving rabbit, they do not range very far from their burrow entrances. The bulk of their diet year-round is sagebrush, although in the spring and summer they eat grasses and forbs as well.

BREEDING

Not much is known about the breeding habits of pygmy rabbits, but it is believed that the breeding season extends from early spring to mid-summer. Females can produce more than one litter per year. Between May and August females give birth to an average of six young. Young rabbits are independent at two months.

STATUS IN WASHINGTON

Pygmy rabbits are found in western Montana, southern Idaho, northern Utah, northern Nevada, southeastern Oregon, northeastern California, and eastern Washington. The population in Washington is disjunct from those in the other states.

In the early part of this century, pygmy rabbits were reported from several eastern Washington counties. Reports vary from common to "rare and of local occurrence." Their population has declined rapidly and their range has been drastically reduced in recent times. Mortality rate is estimated at 70%. Their number may be so low as to make detection very difficult. Being most active dusk to dawn makes their detection difficult as well.

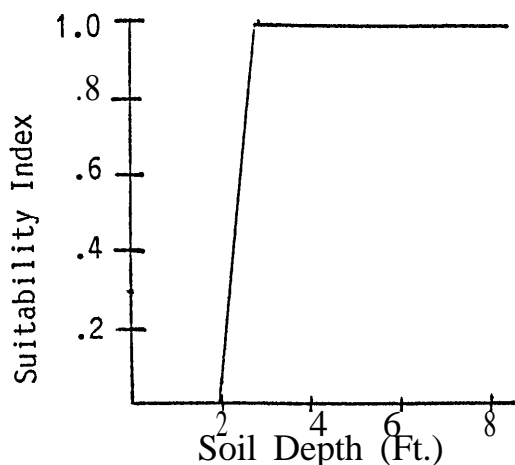
PYGMY RABBIT
(Sylvilagus idahoensis)
Shrub-steppe (SS)

Pygmy Rabbit Habitat Thresholds: *

1. Soils must be soft and rock free versus hardpan and stony (>_ 2Ft. deep).
2. Wyoming Big Sage (Artemesia tridentata wyomingensis) is the sage brush sub-species preferred by Pygmy Rabbits.

* Each site should be evaluated to determine the presence or absence of the threshold requisites. If one or both requisites are absent, do not evaluate further. Conversely, if both requisites are present continue through this draft model to determine baseline SI.

Variable 1: Soil depth parameters.



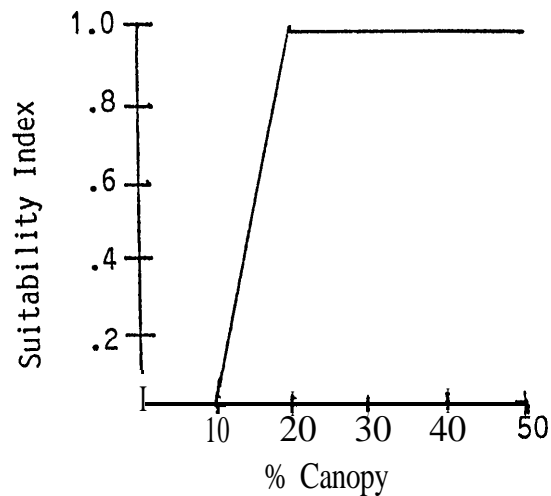
V1 Field Values:

<2' = 0
2' - 2'11" = .5
>3' = 1.0

V2 Field Values:

<10% = 0
10 - 19% = .5
>20% = 1.0

Variable 2: % Sagebrush Canopy



Variable 3: Food/Range Conditions.SV1: Presence of immature Big Sage brush.

Present = 1.0

Absent = 0

SV2: Current Range Conditions.

Good = 1.0

Fair = .5

Poor = 0

SV3: Percent of current year's grass and forb crop remaining.

SV3 Field Values:

> 50% = .0

41 - 50% = .9

31 - 40% = .7

21 - 30% = .5

11 - 20% = .3

0 - 10% = .1

$$SIV3 = \frac{SV1 + SV2 + SV3}{3}$$

$$HSI = \frac{V1 + (V2 \times V3)^{1/2}}{2}$$

Pygmy Rabbit Habitat Thresholds - Cont.**

3. The minimum size of potential pygmy rabbit re-introduction sites should consist of a minimum of 640 acres of shrub-steppe which would include 320 acres of soft deep soils.

** Threshold 3 should only be applied to potential re-introduction sites.

APPENDIX D

GRAND COULEE HABITAT EVALUATION PROCEDURE FIELD TEAM

The HEP Team measured wildlife habitat variables for each of the indicator species in the study area.

<u>HEP Member</u>	<u>Affiliation</u>
David Stevens	Sportsman/Landowner
Chris Merker	UCUT
Maureen Murphy	Colville Tribe
Todd Thompson	BLM
Craig Madsen	scs
Mike Finch	Landowner
Bill Rustemeyer	Landowner
Andy Rustemeyer	Landowner
Mike P. Kuttel	WDW
Ginna Correa	WDW
Steve Judd	CCT
Chuck Perry	WDW
Paul Ashley	WDW
Tom Stralser	EWU
Craig Madsen	scs
Karen Taylor-Woodrich	NPS
Jim Romero	USBR
Don Schmander	Farmer
Ron Friesz	WDW
Jerry Hickman	WDW
Peter Paquet	NPPC
Joel Bich	YIN

WDW - Department of Wildlife
 UCUT - Upper Columbia United Tribes
 BLM - Bureau of Land Management
 CCT - Colville Confederated Tribes
 SCS - Soil Conservation Service
 NPPC - Northwest Power Planning Council
 YIN - Yakima Indian Nation
 USBR - United States Bureau of Reclamation
 NPS - National Park Service
 SC - Steering Committee
 EWU - Eastern Washington University
 NPS - National Park Service
 USBR - United States Bureau of Reclamation

APPENDIX E

BASE LINE HABITAT EVALUATION PROCEDURE RESULTS OF PROPOSED PROJECT AREA

SITE	COUNTY	NUMBER OF ACRES	TOTAL HABITAT UNITS (HUS)	SHARP-TAILED GROUSE HUS	SAGE GROUSE HUS	MULE DEER HUS	PYGMY RABBIT HUS
1	Lincoln	10,154	16,144	8,428	4,061	3,655	- 0 -
2	Lincoln	2,195	5,812	2,459	1,956	1,397	- 0 -
3	Lincoln	1,545	2,363	1,282	618	463	- 0 -
4	Lincoln	2,884	4,961	2,365	1,154	1,442	- 0 -
5	Lincoln	970	1,687	814	388	485	- 0 -

APPENDIX F

INFORMATION ON LIMITED LIABILITY

4.24.200 Liability of owners or others in possession of land and water areas for injuries to recreation users-**Purpose**. The purpose of RCW 4.24.200 and 4.24.210 is to encourage owners or others in lawful possession and control of land and water areas or channels to make them available to the public for recreational purposes by limiting their liability toward persons entering thereon and toward persons who may be injured or otherwise damaged by the acts or omission's of persons entering thereon. [1969 ex.s. c 24 § 1; 1967 c 216 § 1.]

4.24.210 Liability of owners or others in possession of land and water areas for injuries to recreation users-**Limitation**. Any public or private landowners or others in lawful possession and control of any lands whether rural or urban, or water areas or channels and lands adjacent to such areas or channels, who allow members of the public to use them for the purposes of outdoor recreation, which term includes, but is not limited to, the cutting, gathering, and removing of firewood by private persons for their personal use without purchasing the firewood from the landowner, hunting, fishing, camping, pic-nicking, swimming, hiking, bicycling, the riding of horses or other animals, clam digging, pleasure driving of off-road vehicles, snowmobiles, and other vehicles, boating, nature study, winter or water sports, viewing or enjoying historical, archaeological, scenic, or scientific sites, without charging a fee of any kind therefore, shall not be liable for unintentional injuries to such users: *Provided*, That any public or private landowner, or others in lawful possession and control of the land, may charge an administrative fee of up to ten dollars for the cutting, gathering, and removing of firewood from the land: *Provided further*, That nothing in this section shall prevent the liability of such a landowner or others in lawful possession and control for injuries sustained to users by reason of a known dangerous artificial latent condition for which warning signs have not been conspicuously posted: *Provided further*, That nothing in RCW 4.24.200 and 4.24.210 limits or expands in any way the doctrine of attractive nuisance: *And provided further*, That the usage by members of the public is permissive and does not support any claim of adverse possession. [1980 c 111 § 1; 1979 c 53 § 1; 1972 ex.s, c 153 § 17; 1969 ex.s. c 24 § 2; 1967 c 216 § 2.]

APPENDIX G

LISTS OF WILDLIFE AND PLANT SPECIES CITED IN THIS PLAN

<u>Common Name</u>	<u>Scientific Name</u>
Birds	
Sharp-tailed grouse	<u>Tympanuchus phasianellus</u>
Sage grouse	<u>Centrocercus urophasianus</u>
Sage sparrow	<u>Amphispiza belli</u>
Sage thrasher	<u>Oreoscoptes montanus</u>
Ash-throated fly catcher	<u>Myiarchus cinerascens</u>
Grasshopper sparrow	<u>Ammodramus savannarum</u>
Brewer's sparrow	<u>Spizella breweri</u>
Lark sparrow	<u>Chondestes grammacus</u>
Burrowing owl	<u>Athene cunicularia</u>
snowy owl	<u>Nyctea scandiaca</u>
Ferruginous hawk	<u>Buteo regalis</u>
Swainson's hawk	<u>Buteo swainsoni</u>
Prairie falcon	<u>Falco mexicanus</u>
Gyr Falcon	<u>Falco rusticolus</u>
Golden eagle	<u>Aquila chrysaetos</u>
Bald eagle	<u>Haliaeetus leucocephalus</u>
Rock wren	<u>Salpinctes obsoletus</u>
Hungarian partridge	<u>Perdix perdix</u>
California quail	<u>Callipepla californica</u>
Ringneck pheasant	<u>Phasianus colchicus</u>
Lesser yellowlegs	<u>Totanus flavipes</u>
Junco	<u>Junco hyemalis</u>
Mallard	<u>Anas platyrhynchos</u>
Song sparrow	<u>Melospiza melodia</u>
meadow lark	<u>Sturnella neglecta</u>
Horned lark	<u>Eremophila alpestris</u>
Barn swallow	<u>Hirundo rustica</u>
Red-winged blackbird	<u>Agelaius phoeniceus</u>
Wilson's phalarope	<u>Phalaropus tricolor</u>
Red-tailed hawk	<u>Buteo jamaicensis</u>
Northern harrier	<u>Circus cyaneus</u>
Least sandpiper	<u>Calidris minutilla</u>
Canada geese	<u>Branta canadensis</u>
Snipe	<u>Gallinago gallinago</u>
Great blue heron	<u>Ardea herodias</u>
American avocet	<u>Recurvirostra americana</u>
Killdeer	<u>Charadrius vociferus</u>
coot	<u>Fulica americana</u>
Pintail	<u>Anas acuta</u>
Cinnamon teal	<u>Anas cyanoptera</u>
Green-winged teal	<u>Anas carolinensis</u>
Blue-winged teal	<u>Anas discors</u>

Mammals

Pygmy rabbit	<u>Brachylagus idahoensis</u>
White-tailed jackrabbit	<u>Lepus townsendi</u>
Sagebrush vole	<u>Lagurus curtatus</u>
Black-tailed jackrabbit	<u>Lepus californicus</u>
Nuttall's cottontail	<u>Sylvilagus nuttallii</u>
Mule deer	<u>Odocoileus hemionus</u>
White-tailed deer	<u>Odocoileus virginianus</u>
coyote	<u>Canus latrans</u>
Badger	<u>Taxidea taxus</u>
Northern pocket gophers	<u>Thomomys talpoides</u>
Merriam shrew	<u>Sorex merriami</u>
Bobcat	<u>Lynx rufus</u>
Wood rat	<u>Neotoma cinerea</u>
Yellow-bellied marmots	<u>Marmota flaviventris</u>
Skunk	<u>Mephitis mephitis</u>
Meadow vole	<u>Microtus pennsylvanicus</u>
Muskrat	<u>Ondatra zibethica</u>
Raccoon	<u>Procyon lotor</u>
Mink	<u>Mustela vison</u>
Longtailed weasel	<u>Mustela frenata</u>
Deer mouse	<u>Peromyscus maniculatus</u>
Beaver	<u>Castor canadensis</u>
Harvest mice	<u>Reithrodontomys megalotis</u>
Pocket mice	<u>Perognathus parvus</u>

Amphibians/Reptiles

Long-toed salamander	<u>Ambystoma macrodactylum</u>
Tiger salamander	<u>Ambystoma tigrinum</u>
Horned lizard	<u>Phrynosoma douglassi</u>
Sagebrush lizard	<u>Sceloporus graciosus</u>
Spotted frog	<u>Rana pretiosa</u>
Rattlesnake	<u>Crotalus viridis oreganus</u>
Western painted turtle	<u>Chrysemys picta</u>
Tree frog	<u>Hyla regilla</u>

Shrubs/Trees

Big sagebrush	<u>Artemisia tridentata</u>
Three-tipped sagebrush	<u>Artemisia tripartita</u>
Rabbitbrush	<u>Chrysothamnus nauseosus</u>
Greasewood	<u>Sarcobatus vermiculatus</u>
Bitterbrush	<u>Purshia tridentata</u>
Chokecherry	<u>Prunus virginiana</u>
Serviceberry	<u>Amelanchier alnifolia</u>
currant	<u>Ribes cereum</u>
Rose	<u>Rosa spp.</u>
Alder	<u>Alnus tenuifolia</u>
Dogwood	<u>Cornus stolonifera</u>
Waterbirch	<u>Betula occidentalis</u>

Hawthorne
Willow
Aspen
Cottonwood
Snowberry

Crataegus douglasii
Salix spp.
Populus tremuloides
Populus trichocarpa
Symphoricarpus albus

Grass/Forbs/Hydrophytes

Idaho fescue
Blue-bunch wheatgrass
Needle and thread
Cheat grass
Sandberg bluegrass
Wild rye
Buckwheat
Yarrow
Balsamroot
Tumbling mustard
Reed Canary Grass
Salt Grass
Russian Thistle
Smartweed
Dandelion
Salsify
Dock
Lupine
Cattail
Buttercup
Sunflower
Phlox
Hardstem Bulrush
Clover
Cordgrass
Coontail
China Lettuce
Milfoil
Pondweed
Wheat
Barley
Alfalfa

Festuca idahoensis
Agropyron spicatum
Stipa comata
Bromus tectorum
Poa sandbergii
Elymus junceus
Eriogonum spp.
Achillea millefolium
Balsamorhiza sagittata
Sisymbrium altissimum
Phalaris arundinacea
Distichlis spicata
Salsola kali
Polygonum persicaria
Taraxacum officinale
Tragopogon dubius
Rumex crispus
Lupinus spp.
Typha latifolia
Ranunculus occidentalis
Helianthus spp.
Phlox longifolia
Scirpus occidentalis
Trifolium spp.
Spartina spp.
Ceratophyllum demersum
Lactuca spp.
Myriophyllum spp.
Potamogeton spp.
Triticum aestivum
Hordeum spp.
Medicago spp.

APPENDIX H

PUBLIC OUTREACH SUMMARY, GRAND COULEE/CHIEF JOSEPH DAN WILDLIFE MITIGATION

The following list includes presentations, meetings, and consultations with individuals, agencies, and state/local elected officials. News releases, newspaper editorials, brochures, and television coverage were used whenever possible to enhance the effectiveness of the Public Outreach Program.

- o 2-89 Briefing to membership of Lake Roosevelt Forum.
- o 4-05-89 Briefing to representatives of Washington Department of Community Development.
- o 4-11-89 Briefing to representatives of Washington Quail Unlimited organization.
- o 4-21-89 Briefing to membership of Lake Roosevelt Forum.
- o 4-24-89 Consultation with Montana NPPC member John Brenda.
- o 5-05-89 Consultation with Washington NPPC member Ted Bottiger.
- o 5-25-89 Briefing to representatives of Ephrata Sportsmen Club.
- o 6-05-89 Briefing to Washington Department of Wildlife's Wildlife Advisory Council.
- o 6-07-89 Briefing to Washington Wildlife Commission, telephone conference.
- o 8-12-89 Briefing before Washington Wildlife Commission.
- o 8-30-89 Consultation with Washington NPPC member Tom Trulove and Lake Roosevelt Forum.
- o 9-05-09 Spokane Columbia River Wildlife Mitigation Public Outreach meeting.
- o 9-06-89 Wenatchee Columbia River Wildlife Mitigation Public Outreach meeting.
- o 9-07-89 Yakima Columbia River Wildlife Mitigation Public Outreach meeting.
- o 9-11-09 Vancouver Columbia. River Wildlife Mitigation Public Outreach meeting.
- o 9-13-89 Seattle Columbia River Wildlife Mitigation Public Outreach meeting.

- o 9-15-89 Briefing of House Natural Resources and Parks Committee of Washington Legislature.
- o 10-24-89 Briefing of Washington State Senator Scott Barr, local residents, and elected officials in the vicinity of Davenport.
- o 11-03-89 Briefing of Senate Environmental and Natural Resources Committee of Washington Legislature.
- o 11-22-89 Briefing to Washington State Representative Steve Fuhrman, local residents, and elected officials in the vicinity of Kettle Falls.
- o 11-30-89 Consultation with major agencies and tribes on draft Grand Coulee Dam wildlife mitigation goals and the Power Planning process (National Park Service, Bureau of Reclamation, U.S. Fish and Wildlife Service, Colville Tribe, Spokane Tribe, and NPPC staff).
- o 12-15-89 Public review document regarding Grand Coulee Wildlife Mitigation Plan and prioritized goals made available to local government using DCD Intergovernmental Review Process.
- o 1-08-90 Consultation with The Nature Conservancy on Columbia River wildlife mitigation.
- o 1-15-90 Public review document regarding Grand Coulee Wildlife Mitigation Plan and prioritized goals. Mailed to over 700 individuals and organizations statewide with a 30-day written input period.
- o 1-20-90 Consultation with local public and government and conservation/environmental groups in Chewelah. In cooperation with local and state elected officials, the Grand Coulee Wildlife Mitigation Advisory Group was established, consisting of approximately 50 members.
- o 2-07-90 Local government/Grand Coulee Advisory Group consultation to collect formal input on Grand Coulee mitigation goals and to provide background information on the loss statement and Columbia River mitigation planning process.
- o 2-12-90 Davenport public hearing to obtain formal input on Grand Coulee mitigation goals and to provide background information on the loss statement and Columbia River mitigation planning process.
- o 2-13-90 Kettle Falls public hearing to obtain formal input on Grand Coulee mitigation goals and to provide background information on the loss statement and Columbia River mitigation planning process.

- o 3-22-90 Grand Coulee Wildlife Mitigation Advisory Group meeting. Grand Coulee Wildlife Mitigation Steering Committee created as a five-member subset of the Advisory Group.
- o 4-16-90 Grand Coulee Wildlife Mitigation Steering Committee meeting.
- o 4-18-90 Consultation with Ephrata Sportsmen Association on Columbia River wildlife mitigation and Banks Lake.
- o 5-14-90 Grand Coulee Wildlife Mitigation Steering Committee meeting
- o 5-29-90 Consultation with BPA on preliminary Grand Coulee wildlife mitigation strategies.
- o 6-04-90 Lincoln County Wheat Growers meeting in Harrington.
- o 6-06-90 Consultation with BPA on Chief Joseph Dam mitigation planning study "Statement of Work."
- o 6-07-90 Meeting with BLM concerning wildlife management strategies on BLM property in Lincoln County.
- o 6-11-90 Grand Coulee Wildlife Mitigation Steering Committee meeting
- o 6-13-90 Briefing to Davenport Conservation District Board.
- o 6-19-90 Demonstration project briefing with Lee Smith, WDW legislative representative.
- o 6-21-90 Consultation with Lincoln County Commissioner Andy Rustemeyer concerning the demonstration project.
- o 6-25-90 Consultation with BLM area office staff concerning a tour of potential public-owned mitigation sites.
- o 6-28-90 Briefing to Ed Menning, National Park Service, Seattle, concerning National Park participation in Grand Coulee wildlife mitigation.
- o 7-02-90 Briefing to Lincoln County Commissioners in Davenport.
- o 7-12-90 Toured BLM lands in Lincoln County.
- o 7-16-90 Conducted a tour of Lincoln County shrub-steppe habitat with BPA representatives.
- o 7-26-90 Briefed the Davenport Chamber of Commerce on project history, project objectives and goals, and estimated program costs.
- o 7-27-90 Consultation with BPA representatives concerning project advance design requirements.

- 7-31-90 Briefed the NPPC Wildlife Advisory Committee on WDW mitigation efforts, shrub-steppe habitat, and the WDW Public Outreach Program.
- 8-02-90 Grand Coulee Wildlife Mitigation Steering Committee meeting.
- 8-03-90 Consultation with BLM representatives and toured BLM properties for potential inclusion into current mitigation strategies.
- 8-07-90 Consultation with Wildlife Scoping Group concerning project prioritization.
- 9-06-90 Briefing to Stevens County Commissioner Allan Mack.
- 9-10-90 Grand Coulee Wildlife Mitigation Committee meeting.
- 9-14-90 Consultation with NPPC members Bottiger and Trulove on Columbia River wildlife mitigation, the implementation process, and WDW Grand Coulee mitigation project proposals.
- 9-27-90 Consultation with PNUCC and WDW representatives to develop a HEP model for pygmy rabbits.
- 10-11-90 Consultation with NPS representative Karen Taylor Goodrich.
- 10-15-90 Consultation with EWU Research Unit Biologists Chris Merker and Tom Stralser.
- 10-22-90/
10-25-90 Tracy Rock field measurements for HEP. Individuals representing UCUT, CCT, WDW, BLM, SCS, NPPC, YIN, USBR, NPS, EWU, Lincoln County Commissioners, and private landowners participated in the HEP analysis.
- 11-13-90 Briefing with Grand Coulee Steering Committee concerning HEP evaluation results.
- 12-04-90 Consultation with NPS, peregrine fund, BOR regarding Lake Roosevelt mitigation proposal to reestablish peregrine falcon.
- 12-07-90 Briefing with Tracy Rock area landowners regarding results of the HEP process.
- 12-10-90 Submitted outline of Chief Joseph Wildlife Mitigation Planning Study to the Department of Community Development for inclusion in the Washington intergovernmental review process (Federal Clearing House Process).
- 12-13-90 Discussed status of project with Lincoln County Commissioner Andy Rustemeyer.
- 1-03-91 Grand Coulee/Chief Joseph Wildlife Mitigation Steering Committee meeting.

- o 1-10-91 Meeting with Harold Roloff (landowner) and John Martin (TWC).
- o 1-15-91 Consultation with NPPC member Bottiger on Public Outreach Program for Columbia River wildlife mitigation.
- o 2-01-91 Beginning of Chief Joseph Dam Wildlife Mitigation Planning Study. WDW as lead agency for BPA-funded study.
- o 2-07-91 Consultation with BPA on predesign contract elements for Lincoln County sharp-tailed grouse and Douglas County Pygmy Rabbit Project proposals (Grand Coulee mitigation).
- o 2-21-91 First meeting of Chief Joseph Wildlife Mitigation Planning Study Interagency Technical Working Group. Members include WDW, CCT, NPPC, BPA, PNUCC, COE, USFWS, BLM, and UCRC.
- o 3-01-91 Began interviews with local landowners in the Chief Joseph study area: Lee and Joan Hanford, Paul Benson, Tex Troutman, Charles and Sharon Hammon.
- o 3-05-91 Meeting with Douglas County Wheat Growers Association. Reviewed the status of Columbia River wildlife mitigation.
- o 3-06-91 Grand Coulee/Chief Joseph Wildlife Mitigation Steering Committee meeting.
- o 3-08-91 Interviews about study area with Melvin and Shine Thoren, and Lee Hemmer, landowners, Douglas County.
- o 3-12-91 Consultation with BPA concerning components of WDW statement of work for Tracy Rock sharp-tailed grouse proposal and Douglas County Pygmy Rabbit Project.
- o 3-18-91 Briefing with Dave Dormaier (Douglas County landowner) and Douglas County SCS representatives regarding pygmy rabbit management plans and conservation easement terms.
- o 3-21-91 Briefing with Douglas County Steering Committee members regarding the status of the Columbia River Mitigation Program.
- o 4-04-91 Meeting with COE, reviewed Rufus Woods Lake and mitigation sites for ten-foot pool rise.
- o 4-08-91 Chief Joseph Wildlife Mitigation Planning Study Interagency Technical Working Group meeting.
- o 4-10-91 Chief Joseph Project Biologists join COE for trip to Bailey Basin and Buckley Bar on Rufus Woods Lake.
- o 4-10-91 Chief Joseph Project Biologists gave an update to the Ephrata Sportsmen Club about the project.
- o 4-17-91 Chief Joseph Wildlife Mitigation Planning Study public meeting in Bridgeport.

- o 4-25-91 Meeting with Melba Cannon and Shine Thoren; discussed "Bridgeport: A Collection of Memories."
- o 4-30-91 Project Biologists' meeting in Olympia with USFWS to go over HEP models and target species.
- o 5-01-91 Project Biologists reviewed original land survey notes of Chief Joseph Study area at Department of Natural Resources, Olympia.
- o 5-06-91 Grand Coulee pre-design contract begins; funded by BPA.
- o 5-08-91 Chief Joseph Wildlife Mitigation Planning Study Interagency Technical Working Group meeting, and tour of Rufus Woods Lake.
- o 5-09-91 Project Biologists, USFWS, and COE looked at staging areas, spoil piles, and started planning HEP in field.
- o 5-15-91 Project Biologists went to Waterville Soil Conservation Service, Douglas County Courthouse, and Waterville Museum.
- o 5-30-91 Grand Coulee/Chief Joseph Wildlife Mitigation Steering Committee meeting, Spokane.
- o 6-03-91 through 6-06-91 Contacted 30 local landowners for permission to enter their land for HEP study.
- o 6-06-91 Project Biologists met with COE and USFWS; did preliminary HEP field work.
- o 6-10-91 through 6-18-91 Chief Joseph Wildlife Mitigation Habitat Evaluation Procedure field study.
- o 7-10-91 Grand Coulee/Chief Joseph Wildlife Mitigation Advisory Group meeting.
- o 7-16-91 Project Biologists met with COE to discuss aerial photographs of non-inundated (impacted) areas.
- o 7-30-91 through 7-31-91 Chief Joseph Wildlife Mitigation HEP grab samples on Rufus Woods Lake.
- o 8-09-91 Talked to Dick Thompson, retired Game Protector, Department of Game, Electric City.
- o 8-21-91 Chief Joseph Wildlife Mitigation Technical Working Group meeting, Ephrata.
- o 9-03-91 Talked to Jack Wells, landowner, about study area.

- o 9-06-91 Project Biologists met with Jay Weber (Douglas County Commissioner) and later interviewed Harold Weber (longtime area resident landowner).
- o 9-11-91 Project Biologists gave an update of the study to Ephrata Sportsmen Club, Ephrata.
- o 9-13-91 Interviewed George Thalheimer, landowner, Okanogan County.
- o 9-24-91 Second Chief Joseph Wildlife Mitigation Study public meeting, Wright Elementary School, Coulee Dam.
- o 9-25-91 Project Biologists met with COE personnel, Bridgeport, to address comments received at public meeting.
- o 9-25-91 Douglas County Steering Committee meeting, Mansfield.
- o 10-07-91 Project Biologists interviewed Cecil and Eleanor Trefry, Manson longtime residents of Trefry Canyon in the study area.
- o 10-07-91 through 10-08-91 Chief Joseph Wildlife Mitigation HEP study for impacted areas around Chief Joseph Dam.
- o 10-08-91 Briefing Lee Hemmer, landowner, and Wheat Growers Association, Douglas County.
- o 10-08-91 Consultation with COE regarding potential future mitigation lands surrounding Chief Joseph Dam.
- o 10-23-91 Mailed draft report for Chief Joseph Wildlife Mitigation Study to Technical Working Group members.
- o 10-30-91 Chief Joseph Interagency Technical Work Group meeting, Ephrata.
- o 11-01-91 Grand Coulee/Chief Joseph Wildlife Mitigation Steering Committee meeting.
- o 11-20-91 Wildlife mitigation presentation in Sand Point, Idaho at annual BPA contract coordination meeting.
- o 11-25-91 Consultation with Douglas County Commission on Chief Joseph Study and Columbia River mitigation under the Power Act.
- o 12-03-91 Grand Coulee/Chief Joseph Wildlife Mitigation Steering Committee meeting.
- o 12-11-91 Last public hearing conducted to gather formal input on Chief Joseph Dam wildlife habitat losses, estimates, and mitigation objectives.

DOE/BP-1888
July 1992
1C